

THE ASTROPHYSICAL JOURNAL

INDEX TO VOLUME 337, PARTS 1 AND 2 1989 FEBRUARY 1 AND FEBRUARY 15

- ALLOIN, DANIELLE. Detection of Strong Carbon Monoxide Emission from the Host Galaxy of the Quasar I Zw 1. *Richard Barvainis, Danielle Alloin, and Robert Antonucci*. 337, L69, 32-B1 (1989)
- AN, CHANG-HYUK. Magnetohydrodynamic Instabilities in Coronal Arcades. *Chang-Hyuk An, S. T. Suess, and S. T. Wu*. 337, 989, 31-B1 (1989)
- ANTONUCCI, ROBERT. Detection of Strong Carbon Monoxide Emission from the Host Galaxy of the Quasar I Zw 1. *Richard Barvainis, Danielle Alloin, and Robert Antonucci*. 337, L69, 32-B1 (1989)
- APPLEGATE, JAMES H. Magnetic Activity and the Determination of the Tidal Synchronization Time in Close Binaries. *James H. Applegate*. 337, 865, 29-F3 (1989)
- ARTYMOWICZ, PAWEŁ. The Structure of the Beta Pictoris Circumstellar Disk From Combined *IRAS* and Coronagraphic Observations. *Paweł Artymowicz, Christopher Burrows, and Francesco Paresce*. 337, 494, 23-F1 (1989)
- AVERY, L. W. Collisional Rate Coefficients of C_3H_2 , and the Determination of Physical Conditions in Molecular Clouds. *L. W. Avery and Sheldon Green*. 337, 306, 21-B8 (1989)
- BACKER, D. C. A Fast-moving Knot of Radio Emission in the Active Galaxy NGC 1275. *J. M. Marr, D. C. Backer, M. C. H. Wright, A. C. S. Readhead, and R. Moore*. 337, 671, 27-D1 (1989)
- BAGOLY, Z. Magnetized Neutron Stars as Gamma-Ray Bursters: Detection Rates at High Energies. *P. Mészáros, Z. Bagoly, and H. Riffert*. 337, L23, 25-C1 (1989)
- BAILEY, JEREMY. EXO 033319 – 2554.2: An Eclipsing AM Herculis System Showing Cyclotron Emission Features. *Lilia Ferrario, D. T. Wickramasinghe, Jeremy Bailey, I. R. Tuohy, and J. H. Hough*. 337, 832, 29-C7 (1989)
- BARBARO, GUIDO. Models of Spectral Energy Distributions of Elliptical Galaxies. *Guido Barbaro and Fabrizio M. Olivari*. 337, 125, 18-F6 (1989)
- BARON, E. Pressure-confined Lyman-Alpha Clouds. *E. Baron, R. F. Carswell, C. J. Hogan, and R. J. Weymann*. 337, 609, 26-F1 (1989)
- BARRETT, ALAN H. CO in Optically Selected Starburst Galaxies. *James M. Jackson, Ronald L. Snell, Paul T. P. Ho, and Alan H. Barrett*. 337, 680, 27-D1 (1989)
- BARTEL, NORBERT. VLBI Observations of SN 1986J: Deviations from Spherical Symmetry in Its Radio Brightness Distribution. *Norbert Bartel, Michael R. Rupen, and Irwin I. Shapiro*. 337, L85, 32-C7 (1989)
- BARVAINIS, R. VLBI and Polarimetric Observations of the SiO Masers in R Cassiopeiae. *G. C. McIntosh, C. R. Predmore, J. M. Moran, L. J. Greenhill, A. E. E. Rogers, and R. Barvainis*. 337, 934, 30-D9 (1989)
- BARVAINIS, RICHARD. Detection of Strong Carbon Monoxide Emission from the Host Galaxy of the Quasar I Zw 1. *Richard Barvainis, Danielle Alloin, and Robert Antonucci*. 337, L69, 32-B1 (1989)
- BAUER, WENDY HAGEN. Line Identifications in the Ultraviolet Spectrum of 31 Cygni (Abstract of Paper in 1989 March Suppl.). *Wendy Hagen Bauer and Robert E. Stencel*. 337, 1038, 31-E13 (1989)
- BAZZANO, A. Hard X-Ray Spectrum of Supernova 1987A on Day 407. *P. Ubertini, A. Bazzano, R. Sood, R. Stauber, T. J. Sumner, and G. Frye*. 337, L19, 25-B11 (1989)
- BEGELMAN, MITCHELL C. Self-absorbed Synchrotron Sources in Active Galactic Nuclei. *Martijn de Kool, Mitchell C. Begelman, and Marek Sikora*. 337, 66, 17-G5 (1989)
- BEICHMAN, C. A. Dust and Gas Emission in Barnard 5. *W. D. Langer, R. W. Wilson, P. F. Goldsmith, and C. A. Beichman*. 337, 355, 21-F10 (1989)
- BERNSTEIN, G. M. Anisotropy of the Diffuse Background at Millimeter Wavelengths. *G. M. Bernstein, M. L. Fischer, P. L. Richards, J. B. Peterson, and T. Timusk*. 337, L1, 25-A6 (1989)
- BETZ, A. L. Heterodyne Spectroscopy of the $J = 17-16$ CO Line in Orion. *R. T. Boreiko, A. L. Betz, and J. Zmuidzinas*. 337, 332, 21-D11 (1989)
- BISHOP, JEFFREY L. On the Determination of Distribution Functions by Numerical Methods. *Jeffrey L. Bishop*. 337, 155, 19-B4 (1989)
- BLONDIN, JOHN M. Hebig-Haro Objects as the Heads of Radiative Jets. *John M. Blondin, Arieh Königl, and Bruce A. Fryxell*. 337, L37, 25-D1 (1989)
- BODENHEIMER, PETER. Double-Core Evolution. III. The Evolution of a $5 M_{\odot}$ Red Giant with a $1 M_{\odot}$ Companion. *Ronald E. Taam and Peter Bodenheimer*. 337, 849, 29-E1 (1989)
- BOREIKO, R. T. Heterodyne Spectroscopy of the $J = 17-16$ CO Line in Orion. *R. T. Boreiko, A. L. Betz, and J. Zmuidzinas*. 337, 332, 21-D11 (1989)
- BRAND, EREZ. Light Reprocessing in the Echo Model of Luminous Arcs. *Erez Braun and Mordehai Milgrom*. 337, 644, 27-A9 (1989)
- BRECHT, STEPHEN H. Minimum Mach Number for Impulsive Proton Acceleration by Parallel Collisionless Shock Waves in Solar Flares. *Dean F. Smith and Stephen H. Brecht*. 337, 954, 30-F1 (1989)
- BREGMAN, JOEL N. The Effects of Magnetic Fields on the Growth of Thermal Instabilities in Cooling Flows. *Laurence P. David and Joel N. Bregman*. 337, 97, 18-C4 (1989)
- BREUECKNER, G. E. Intermediate-Term Solar Periodicities: 100–500 Days. *J. L. Lean and G. E. Brueckner*. 337, 568, 24-E8 (1989)
- BURROWS, CHRISTOPHER. The Structure of the Beta Pictoris Circumstellar Disk From Combined *IRAS* and Coronagraphic Observations. *Paweł Artymowicz, Christopher Burrows, and Francesco Paresce*. 337, 494, 23-F1 (1989)
- High-Resolution Coronagraphy of the Circumstellar Environment of SN 1987A. *Francesco Paresce and Christopher Burrows*. 337, L13, 25-B6 (1989)
- CADITZ, DAVID. Cosmological Parameters and Evolution of the Galaxy Luminosity Function. *David Caditz and Vahé Petrosian*. 337, L65, 32-A10 (1989)
- CANTÓ, JORGE. VLA Observations of the High-Velocity Bipolar OH Absorption in L1551. *Luis F. Rodriguez, Jorge Cantó, I. Félix Mirabel, and Abraham Ruiz*. 337, 712, 27-G1 (1989)
- CARLSTROM, J. E. Millimeter Continuum Observations of a Massive Protostellar Core in Sagittarius B2. *J. E. Carlstrom and S. N. Vogel*. 337, 408, 22-D3 (1989)
- CARSWELL, R. F. Pressure-confined Lyman-Alpha Clouds. *E. Baron, R. F. Carswell, C. J. Hogan, and R. J. Weymann*. 337, 609, 26-F1 (1989)
- CASEY, S. Far-Infrared and Submillimeter Photometric Mapping of Spiral Galaxies in the Virgo Cluster. *A. A. Stark, J. A. Davidson, S. Platt, D. A. Harper, R. Pernic, R. Loewenstein, S. Platt, G. Engargiola, and S. Casey*. 337, 650, 27-B1 (1989)
- CASSAR, L. Lunar Occultations of *IRAS* Point Sources, 1991–2000 (Abstract of Paper in 1989 March Suppl.). *L. Cassar, W. P. Chen, and M. Simon*. 337, 1038, 31-E13 (1989)
- CASSINELLI, JOSEPH P. A Rotating, Magnetic, Radiation-driven Wind Model for Wolf-Rayet Stars. *Clint H. Poe, David B. Friend, and Joseph P. Cassinelli*. 337, 888, 30-A1 (1989)
- CERRUTI-SOLA, M. Fast Winds from the Central Stars of NGC 6543 and NGC 6826. *M. Perinotto, M. Cerruti-Sola, and H. J. G. L. M. Lamers*. 337, 382, 22-B1 (1989)
- CHAKRABARTI, SANDIP K. Studying Shocks in Model Astrophysical Flows. *Sandip K. Chakrabarti*. 337, L89, 32-C11 (1989)
- CHEN, W. P. Lunar Occultations of *IRAS* Point Sources, 1991–2000 (Abstract of Paper in 1989 March Suppl.). *L. Cassar, W. P. Chen, and M. Simon*. 337, 1038, 31-E13 (1989)
- CHENG, ANDREW F. Radio Pulsar Spin-Down: Tests of Pulsar Models. *Andrew F. Cheng*. 337, 803, 29-A1 (1989)
- CHENG, F. H. Spectral Evolution of Accretion Disks of Dwarf Novae. II. Radiative Transfer Models. *F. H. Cheng and D. N. C. Lin*. 337, 432, 22-F9 (1989)
- CHENG, K. S. Period Difference between X-Ray and Very High Energy Gamma-Ray Observations of Accreting X-Ray Pulsars. *K. S. Cheng and Mahvin Ruderman*. 337, L77, 32-B10 (1989)

- CHERNOFF, DAVID F. Supernova 1987A and the Emergence of the Hot Neutron Star: A Semianalytic Approach. *David F. Chernoff, Stuart L. Shapiro, and Ira Wasserman.* 337, 814, 29-B1 (1989)
- CLAAS, J. J. Non-Equilibrium Ionization Effects in the Supernova Remnant RCW 86. *J. J. Claas, A. Smith, J. S. Kaastra, P. A. J. de Korte, and A. Peacock.* 337, 399, 22-C6 (1989)
- CLAVEL, J. Hot Dust on the Outskirts of the Broad-Line Region in Fairall 9. *J. Clavel, W. Wamsteker, and I. S. Glass.* 337, 236, 20-C7 (1989)
- CLEARY, PAUL W. Periodic Orbits in the Schwarzschild Galactic Potential. *Paul W. Cleary.* 337, 108, 18-D5 (1989)
- CODINA-LANDABERRY, S. J. The Chemical Composition of the Emitting Gas in HM Sagittae. *J. A. De Freitas Pacheco, S. J. Codina-Landaberry, and Dalton F. Lopes.* 337, 520, 24-A1 (1989)
- COHEN, JUDITH G. Slow Expansion of the Shell of the Recurrent Nova T Pyxidis and Detection of Faint Extended Envelope. *Michael M. Shara, Anthony F. J. Moffat, Robert E. Williams, and Judith G. Cohen.* 337, 720, 28-A1 (1989)
- COLES, W. A. Propagation Observations of the Solar Wind near the Sun. *W. A. Coles and J. K. Harmon.* 337, 1023, 31-D10 (1989)
- COLLINS, WILLIAM. The Theory of Magnetohydrodynamic Wave Generation by Localized Sources. I. General Asymptotic Theory. *William Collins.* 337, 548, 24-C12 (1989)
- COMINSKY, L. R. Further Observations of the Eclipsing X-Ray Burst Source MXB 1659 – 29. *L. R. Cominsky and K. S. Wood.* 337, 485, 23-E4 (1989)
- CONTI, PETER S. Spectroscopic Studies of Wolf-Rayet Stars. IV. Optical Spectrophotometry of the Emission Lines in Galactic and Large Magellanic Cloud Stars. *Peter S. Conti and Philip Massey.* 337, 251, 20-D12 (1989)
- CORNWELL, T. J. RX Puppis: Detection of Asymmetrical Radio Structure. *J. M. Hollis, F. Yusef-Zadeh, T. J. Cornwell, R. J. Oliversen, A. G. Michalitsianos, and M. Kafatos.* 337, 514, 23-G9 (1989)
- COTÉ, J. Relations between the Photospheric Magnetic Field and the Emission from the Outer Atmospheres of Cool Stars. I. The Solar Ca II K Line Core Emission. *C. J. Schrijver, J. Coté, C. Zwaan, and S. H. Saar.* 337, 964, 30-F12 (1989)
- DAVID, LAURENCE P. The Effects of Magnetic Fields on the Growth of Thermal Instabilities in Cooling Flows. *Laurence P. David and Joel N. Bregman.* 337, 97, 18-C4 (1989)
- DAVIDSON, J. A. Far-Infrared and Submillimeter Photometric Mapping of Spiral Galaxies in the Virgo Cluster. *A. A. Stark, J. A. Davidson, S. Platt, D. A. Harper, R. Pernic, R. Loewenstein, S. Platt, G. Engargiola, and S. Casey.* 337, 650, 27-B1 (1989)
- DAVILA, JOSEPH M. The Accretion of Interplanetary Dust by Ap and Am Stars. *C. Krishna Kumar, Joseph M. Davila, and R. Rajan Sundar.* 337, 414, 22-D9 (1989)
- DE BERNARDIS, P. Infrared Emission from Interplanetary Dust. *P. Temi, P. De Bernardis, S. Mai, G. Moreno, and A. Salama.* 337, 528, 24-B1 (1989)
- DE FREITAS PACHECO, J. A. The Chemical Composition of the Emitting Gas in HM Sagittae. *J. A. De Freitas Pacheco, S. J. Codina-Landaberry, and Dalton F. Lopes.* 337, 520, 24-A1 (1989)
- DE KOOL, MARTIJN. Self-absorbed Synchrotron Sources in Active Galactic Nuclei. *Martijn de Kool, Mitchell C. Begelman, and Marek Sikora.* 337, 66, 17-G5 (1989)
- DE KORTE, P. A. J. Non-Equilibrium Ionization Effects in the Supernova Remnant RCW 86. *J. J. Claas, A. Smith, J. S. Kaastra, P. A. J. de Korte, and A. Peacock.* 337, 399, 22-C6 (1989)
- DUBISCH, RUSSELL. Using Far-Infrared Limb Brightening to Probe Isolated Dark Globules. *Chun Ming Leung, Estela V. O'Brien, and Russell Dubisch.* 337, 293, 21-A9 (1989)
- DZIEMBOWSKI, W. A. The Radial Gradient in the Sun's Rotation. *W. A. Dziembowski, Philip R. Goode, and K. G. Libbrecht.* 337, L53, 25-E5 (1989)
- EDGAR, B. KEVIN. Properties of H II Region Populations in Galaxies. II. The H II Region Luminosity Function. *Robert C. Kennicutt, Jr., B. Kevin Edgar, and Paul W. Hodge.* 337, 761, 28-D10 (1989)
- EICHLER, DAVID. On the Explosive Origin Hypothesis for Present-Day Cosmic Voids and Peculiar Velocities. *Biman B. Nath and David Eichler.* 337, 1, 17-A9 (1989)
- EISENSTAEDT, J. Density Constraints on Local Inhomogeneity in Cosmology. *J. Eisenstaedt and N. O. Santos.* 337, 601, 26-E4 (1989)
- ENGARGIOLA, G. Far-Infrared and Submillimeter Photometric Mapping of Spiral Galaxies in the Virgo Cluster. *A. A. Stark, J. A. Davidson, S. Platt, D. A. Harper, R. Pernic, R. Loewenstein, S. Platt, G. Engargiola, and S. Casey.* 337, 650, 27-B1 (1989)
- ENGLAND, MARTIN N. High-Resolution Neutral Hydrogen Observations: The Barred Spiral Galaxy NGC 1300. *Martin N. England.* 337, 191, 19-F1 (1989)
- FALL, S. MICHAEL. Limits on Dust in Damped Lyman-Alpha Systems and the Obscuration of Quasars. *S. Michael Fall and Yichuan C. Pei.* 337, 7, 17-B1 (1989)
- FERRARIO, LILIA. EXO 033319 – 25542: An Eclipsing AM Herculis System Showing Cyclotron Emission Features. *Lilia Ferrario, D. T. Wickramasinghe, Jeremy Bailey, I. R. Tuohy, and J. H. Hough.* 337, 832, 29-C7 (1989)
- FEY, A. L. VLBI Angular Broadening Measurements in the Cygnus Region. *A. L. Fey, S. R. Spangler, and R. L. Mutel.* 337, 730, 28-B1 (1989)
- FIELDUS, MICHAEL S. Infrared Spectroscopy of Cepheids: Peculiar Velocity Structure and Its Effect on Radii and Distances. *Dimitar D. Sasselov, John B. Lester, and Michael S. Fieldus.* 337, L29, 25-C7 (1989)
- FISCHER, M. L. Anisotropy of the Diffuse Background at Millimeter Wavelengths. *G. M. Bernstein, M. L. Fischer, P. L. Richards, J. B. Peterson, and T. Timusk.* 337, L1, 25-A6 (1989)
- FOLTZ, CRAIG. A Spiral Galaxy at $z = 0.366$ Which Overlaps the Image of the Quasar 4C 39.47. *Paul Hintzen, W. Romanishin, Craig Folz, and William Keel.* 337, L5, 25-A10 (1989)
- FORREST, W. J. Near-Infrared Images of the Bipolar Nebula OH 0739 – 14. *C. E. Woodward, W. J. Forrest, J. L. Pipher, A. Moneti, and M. A. Shure.* 337, 754, 28-D2 (1989)
- FREEMAN, K. C. The Optical and Near-Infrared Distribution of Light in the Edge-on Galaxy IC 2531. *R. J. Wainscoat, K. C. Freeman, and A. R. Hyland.* 337, 163, 19-C1 (1989)
- FRIEND, DAVID B. A Rotating, Magnetic, Radiation-driven Wind Model for Wolf-Rayet Stars. *Clint H. Poe, David B. Friend, and Joseph P. Cassinelli.* 337, 888, 30-A1 (1989)
- FRYE, G. Hard X-Ray Spectrum of Supernova 1987A on Day 407. *P. Ubertini, A. Bazzano, R. Sood, R. Staubert, T. J. Sumner, and G. Frye.* 337, L19, 25-B1 (1989)
- FRYXELL, BRUCE A. Heilig-Haro Objects as the Heads of Radiative Jets. *John M. Blondin, Ariele Königl, and Bruce A. Fryxell.* 337, L37, 25-D1 (1989)
- FUKUGITA, M. Rotating Stellar Collapse Model for Supernova SN 1987A. *T. Nakamura and M. Fukugita.* 337, 466, 23-C8 (1989)
- Reaction Cross Section for "Solar Flare Neutrinos" with ^{37}Cl and ^{16}O Targets. *M. Fukugita, Y. Kohyama, K. Kubodera, and T. Kuramoto.* 337, L59, 25-E11 (1989)
- FUKUI, YASUO. High-Resolution CO Observations of NGC 1068. *Noboru Kaneko, Kazuhiko Morita, Yasuo Fukui, Koji Sugitani, Takahiro Iwata, Naomasa Nakai, Norio Kaifu, and Harvey S. Liszt.* 337, 691, 27-E7 (1989)
- GIRAUD, EDMOND. A Gravitational Lens Explanation for the Arclike Structure in Cl 0500 – 24. *Joachim Wambsganss, Edmond Giraud, Peter Schneider, and Achim Weiss.* 337, L73, 32-B5 (1989)
- GLASS, I. S. Hot Dust on the Outskirts of the Broad-Line Region in Fairall 9. *J. Clavel, W. Wamsteker, and I. S. Glass.* 337, 236, 20-C7 (1989)
- GOLDSMITH, P. F. Dust and Gas Emission in Barnard 5. *W. D. Langer, R. W. Wilson, P. F. Goldsmith, and C. A. Beichman.* 337, 355, 21-F10 (1989)
- GOLDSMITH, PAUL F. CO Isotope Studies of the Sagittarius B2 Molecular Cloud. *Dariusz C. Lis and Paul F. Goldsmith.* 337, 704, 27-F1 (1989)
- GONZÁLEZ, LUIS E. Calán-Tololo Survey. I. Seyfert 1 Galaxies (Abstract of Paper in 1989 March Suppl.). *José Maza, María Teresa Ruiz, Luis E. González, and Marina Wischnjewsky.* 337, 1036, 31-E11 (1989)
- GOODE, PHILIP R. The Radial Gradient in the Sun's Rotation. *W. A. Dziembowski, Philip R. Goode, and K. G. Libbrecht.* 337, L53, 25-E5 (1989)
- GOODMAN, JEREMY. Black Holes or Dark Clusters in M31 and M32? *Jeremy Goodman and Hyung Mok Lee.* 337, 84, 18-B1 (1989)
- GORDON, M. A. Millimeter-Wave Recombination Lines from Radio-bright H II Regions. *M. A. Gordon.* 337, 782, 28-F5 (1989)
- GOSS, W. M. Aperture Synthesis Observations of the 21 Centimeter Zeeman Effect toward Orion A. *T. H. Troland, C. Heiles, and W. M. Goss.* 337, 342, 21-E9 (1989)
- GOULD, ROBERT J. Born-Approximation and Radiative Corrections to Pair Production in Photon-Photon Collisions. *Robert J. Gould.* 337, 950, 30-E11 (1989)
- GOUTTEBROZE, PIERRE. Solar Atmospheric Dynamics. III. The Effect of Acoustic Waves on the Mg II k Line Profile. *Pierre Gouttebroze.* 337, 536, 24-B12 (1989)
- GREEN, E. M. Population Studies. VI. The Transition from Halo to Thin Disk. *John E. Norris and E. M. Green.* 337, 272, 20-F9 (1989)
- GREEN, SHELDON. Collisional Rate Coefficients of C_2H_2 and the Determination of Physical Conditions in Molecular Clouds. *L. W. Avery and Sheldon Green.* 337, 306, 21-B8 (1989)
- GREENHILL, L. J. VLBI and Polarimetric Observations of the SiO Masers

- in R Cassiopeiae. *G. C. McIntosh, C. R. Predmore, J. M. Moran, L. J. Greenhill, A. E. E. Rogers, and R. Barvainis.* 337, 934, 30-D9 (1989)
- GREGG, MICHAEL D. Differential Population Synthesis of 90 Galaxies. II. Methods and Results. *Michael D. Gregg.* 337, 45, 17-E1 (1989)
- GRINSTEIN, BENJAMIN. On the Validity of the Zel'dovich Approximation. *Benjamin Grinstein and Mark B. Wise.* 337, 579, 24-F5 (1989) (Orig. paper in 320, 448, 114-C11)
- GULLIXSON, CRAIG A. Optical and Infrared Surface Photometry of NGC 3077. *Jill S. Price and Craig A. Gullixson.* 337, 658, 27-B10 (1989)
- GUSTAFSON, BO A. S. Comet Ejection and Dynamics of Nonspherical Dust Particles and Meteoroids. *Bo A. S. Gustafson.* 337, 945, 30-E6 (1989)
- HARMON, J. K. Propagation Observations of the Solar Wind near the Sun. *W. A. Coles and J. K. Harmon.* 337, 1023, 31-D10 (1989)
- HARPER, D. A. Far-Infrared and Submillimeter Photometric Mapping of Spiral Galaxies in the Virgo Cluster. *A. A. Stark, J. A. Davidson, S. Platt, D. A. Harper, R. Pernic, R. Loewenstein, S. Platt, G. Engargiola, and S. Casey.* 337, 650, 27-B1 (1989)
- HARTMANN, L. Wind-Disk Shocks around T Tauri Stars. *L. Hartmann and J. C. Raymond.* 337, 903, 30-B6 (1989)
- HASINGER, G. A Third X-Ray Spectral Mode in Scorpius X-1: Similarities to the Other Bright Bulge Sources. *G. Hasinger, W. C. Priedhorsky, and J. Middleditch.* 337, 843, 29-D4 (1989)
- HECKMAN, T. M. Multicolor Surface Photometry of Powerful Radio Galaxies. I. Observations and Data Reduction (Abstract of Paper in 1989 March Suppl.). *Eric P. Smith and T. M. Heckman.* 337, 1036, 31-E11 (1989)
- HEILES, C. Aperture Synthesis Observations of the 21 Centimeter Zeeman Effect toward Orion A. *T. H. Troland, C. Heiles, and W. M. Goss.* 337, 342, 21-E9 (1989)
- HEYER, MARK H. Comparison of the Far-Infrared and Carbon Monoxide Emission in Heiles' Cloud 2 and B18. *Ronald L. Snell, Mark H. Heyer, and F. Peter Schloerb.* 337, 739, 28-C1 (1989)
- HINTZEN, PAUL A. A Spiral Galaxy at $z = 0.366$ Which Overlaps the Image of the Quasar 4C 39.47. *Paul Hintzen, W. Romanishin, Craig Foltz, and William Keel.* 337, L5, 25-A10 (1989)
- HO, PAUL T. P. CO in Optically Selected Starburst Galaxies. *James M. Jackson, Ronald L. Snell, Paul T. P. Ho, and Alan H. Barrett.* 337, 680, 27-D10 (1989)
- HODGE, PAUL W. Properties of H II Region Populations in Galaxies. II. The H II Region Luminosity Function. *Robert C. Kennicutt, Jr., B. Kevin Edgar, and Paul W. Hodge.* 337, 761, 28-D10 (1989)
- HOGAN, C. J. Pressure-confined Lyman-Alpha Clouds. *E. Baron, R. F. Carswell, C. J. Hogan, and R. J. Weymann.* 337, 609, 26-F1 (1989)
- HOLLIS, J. M. RX Puppis: Detection of Asymmetrical Radio Structure. *J. M. Hollis, F. Yusef-Zadeh, T. J. Cornwell, R. J. Oliversen, A. G. Michalitsianos, and M. Kafatos.* 337, 514, 23-G9 (1989)
- The Outer R Aquarii Nebula: Comparison of 6 Centimeter Radio Continuum and Balmer Line Emission. *J. M. Hollis, R. J. Oliversen, and R. Mark Wagner.* 337, 795, 28-G4 (1989)
- HOUGH, J. H. EXO 033319 – 2554.2: An Eclipsing AM Herculis System Showing Cyclotron Emission Features. *Lilia Ferrario, D. T. Wickramasinghe, Jeremy Bailey, I. R. Tuohy, and J. H. Hough.* 337, 832, 29-C7 (1989)
- HOWARTH, IAN D. The Stellar Winds of 203 Galactic O Stars: A Quantitative Ultraviolet Survey (Abstract of Paper in 1989 March Suppl.). *Ian D. Howarth and Raman K. Prinja.* 337, 1037, 31-E12 (1989)
- HUGHES, JOHN P. The Mass of the Coma Cluster: Combined X-Ray and Optical Results. *John P. Hughes.* 337, 21, 17-C5 (1989)
- HYLAND, A. R. The Optical and Near-Infrared Distribution of Light in the Edge-on Galaxy IC 2531. *R. J. Wainscoat, K. C. Freeman, and A. R. Hyland.* 337, 163, 19-C1 (1989)
- IRVINE, NELSON J. HD 93521: A High-Latitude Shell Star. *Nelson J. Irvine.* 337, L33, 25-C11 (1989)
- IWATA, TAKAHIRO. High-Resolution CO Observations of NGC 1068. *Noboru Kaneko, Kazuhiko Morita, Yasuo Fukui, Koji Sugitani, Takahiro Iwata, Naomasa Nakai, Norio Kaifu, and Harvey S. Liszt.* 337, 691, 27-E7 (1989)
- JACKSON, JAMES M. CO in Optically Selected Starburst Galaxies. *James M. Jackson, Ronald L. Snell, Paul T. P. Ho, and Alan H. Barrett.* 337, 680, 27-D10 (1989)
- JANES, KENNETH A. The Luminosity Scale of RR Lyrae Stars with the Baade-Wesselink Method. I. Photometry and Radial Velocities (Abstract of Paper in 1989 March Suppl.). *Tianxing Liu and Kenneth A. Janes.* 337, 1038, 31-E13 (1989)
- JIN, LIPING. Primordial Helium Production by Pregalactic Accreting Black Holes. *Liping Jin.* 337, 603, 26-E6 (1989)
- JOG, CHANDRA J. The Velocity Dispersion of the Giant Molecular Clouds: A Viscous Origin: Erratum. *Chanda J. Jog and Jeremiah P. Ostriker.* 337, 1035, 31-E8 (1989) (Orig. paper in 328, 404, 67-D10)
- JORDANA, J. J. RDZ. Three-dimensional Morphological Segregation in Rich Clusters of Galaxies. *E. Salvador-Solé, M. Sanrom, and J. J. Rdz. Jordana.* 337, 636, 27-A1 (1989)
- KAASTRA, J. S. Non-Equilibrium Ionization Effects in the Supernova Remnant RCW 86. *J. J. Claas, A. Smith, J. S. Kaastra, P. A. J. de Korte, and A. Peacock.* 337, 399, 22-C6 (1989)
- KAFATOS, M. RX Puppis: Detection of Asymmetrical Radio Structure. *J. M. Hollis, F. Yusef-Zadeh, T. J. Cornwell, R. J. Oliversen, A. G. Michalitsianos, and M. Kafatos.* 337, 514, 23-G9 (1989)
- KAI, KEIZO. The Spatial, Spectral, and Temporal Character of the Hard X-Ray Flare of 1982 February 3. *Nariaki Nitta, Alan L. Kiplinger, and Keizo Kai.* 337, 1003, 31-C2 (1989)
- KAIFU, NORIO. High-Resolution CO Observations of NGC 1068. *Noboru Kaneko, Kazuhiko Morita, Yasuo Fukui, Koji Sugitani, Takahiro Iwata, Naomasa Nakai, Norio Kaifu, and Harvey S. Liszt.* 337, 691, 27-E7 (1989)
- KALER, JAMES B. Apparent Magnitudes of Luminous Planetary Nebula Nuclei. II. A Survey of Southern Hemisphere Planetary Nebulae (Abstract of Paper in 1989 March Suppl.). *Richard A. Shaw and James B. Kalter.* 337, 1037, 31-E12 (1989)
- KANEKO, NOBORU. High-Resolution CO Observations of NGC 1068. *Noboru Kaneko, Kazuhiko Morita, Yasuo Fukui, Koji Sugitani, Takahiro Iwata, Naomasa Nakai, Norio Kaifu, and Harvey S. Liszt.* 337, 691, 27-E7 (1989)
- KAWARA, KIMIAKI. Brackett α and γ Observations of Starburst and Seyfert Galaxies. *Kimiaki Kawara, Minoru Nishida, and M. M. Phillips.* 337, 230, 20-C1 (1989)
- KEEL, WILLIAM. A Spiral Galaxy at $z = 0.366$ Which Overlaps the Image of the Quasar 4C 39.47. *Paul Hintzen, W. Romanishin, Craig Foltz, and William Keel.* 337, L5, 25-A10 (1989)
- KENNICUTT, ROBERT C., JR. Properties of H II Region Populations in Galaxies. II. The H II Region Luminosity Function. *Robert C. Kennicutt, Jr., B. Kevin Edgar, and Paul W. Hodge.* 337, 761, 28-D10 (1989)
- KIM, D.-W. Interstellar Matter in Early-Type Galaxies. III. Radio Emission and Star Formation. *D. E. P. Walsh, G. R. Knapp, J. M. Wrobel, and D.-W. Kim.* 337, 209, 19-G9 (1989)
- KIPLINGER, ALAN L. The Spatial, Spectral, and Temporal Character of the Hard X-Ray Flare of 1982 February 3. *Nariaki Nitta, Alan L. Kiplinger, and Keizo Kai.* 337, 1003, 31-C2 (1989)
- KITAMOTO, SHUNJI. Discovery of a Bright X-Ray Nova, GS 2000 + 25. *Hirosi Tsunemi, Shunji Kitamoto, Sadanori Okamura, and Diane Roussel-Dupré.* 337, L81, 32-C1 (1989)
- KNAPP, G. R. Interstellar Matter in Early-Type Galaxies. III. Radio Emission and Star Formation. *D. E. P. Walsh, G. R. Knapp, J. M. Wrobel, and D.-W. Kim.* 337, 209, 19-G9 (1989)
- KOHYAMA, Y. Reaction Cross Section for "Solar Flare Neutrinos" with ^{37}Cl and ^{16}O Targets. *M. Fukugita, Y. Kohyama, K. Kubodera, and T. Kuramoto.* 337, L59, 25-E11 (1989)
- KÖNIGL, ARIEH. Heig-Haro Objects as the Heads of Radiative Jets. *John M. Blondin, Arieh Königl, and Bruce A. Fryxell.* 337, L37, 25-D1 (1989)
- KOO, BON-CHUL. Extremely High-Velocity Molecular Flows in Young Stellar Objects. *Bon-Chul Koo.* 337, 318, 21-C8 (1989)
- KOO, DAVID C. Close Pairs of Galaxies in Deep Sky Surveys. *Stephen E. Zepf and David C. Koo.* 337, 34, 17-D6 (1989)
- KOVNER, ISRAEL. Diagnostics of Compact Clusters of Galaxies by Giant Luminous Arcs. *Israel Kovner.* 337, 621, 26-F14 (1989)
- KUBODERA, K. Reaction Cross Section for "Solar Flare Neutrinos" with ^{37}Cl and ^{16}O Targets. *M. Fukugita, Y. Kohyama, K. Kubodera, and T. Kuramoto.* 337, L59, 25-E11 (1989)
- KUMAR, C. KRISHNA. The Accretion of Interplanetary Dust by Ap and Am Stars. *C. Krishna Kumar, Joseph M. Davila, and R. Rajan Sundar.* 337, 414, 22-D9 (1989)
- KURAMOTO, T. Reaction Cross Section for "Solar Flare Neutrinos" with ^{37}Cl and ^{16}O Targets. *M. Fukugita, Y. Kohyama, K. Kubodera, and T. Kuramoto.* 337, L59, 25-E11 (1989)
- LAMERS, H. J. G. L. M. Fast Winds from the Central Stars of NGC 6543 and NGC 6826. *M. Perinotto, M. Cerruti-Sola, and H. J. G. L. M. Lamers.* 337, 382, 22-B1 (1989)
- LANGER, W. D. Dust and Gas Emission in Barnard 5. *W. D. Langer, R. W. Wilson, P. F. Goldsmith, and C. A. Beichman.* 337, 355, 21-F10 (1989)
- LEAN, J. L. Intermediate-Term Solar Periodicities: 100–500 Days. *J. L. Lean and G. E. Brueckner.* 337, 568, 24-E8 (1989)
- LEE, HYUNG MOON. Black Holes or Dark Clusters in M31 and M32?

- Jeremy Goodman and Hyung Mok Lee.* 337, 84, 18-B1 (1989)
- LEIGHTON, R. B. Interferometric C¹⁸O Observations of DR 21(OH) and L1551 IRS 5 at $\gamma = 1.4$ Millimeters. *S. Padin, A. I. Sargent, L. G. Mundy, N. Z. Scoville, D. P. Woody, R. B. Leighton, C. R. Masson, S. L. Scott, T. V. Seling, K. R. Stapelfeldt, and S. Terebey.* 337, L45, 25-D9 (1989)
- LESTER, JOHN B. Infrared Spectroscopy of Cepheids: Peculiar Velocity Structure and Its Effect on Radii and Distances. *Dimitar D. Sasselov, John B. Lester, and Michael S. Fieldus.* 337, L29, 25-C7 (1989)
- LEUNG, CHUN MING. Using Far-Infrared Limb Brightening to Probe Isolated Dark Globules. *Chun Ming Leung, Estela V. O'Brien, and Russell Dubisch.* 337, 293, 21-A9 (1989)
- LIBBRECHT, K. G. The Radial Gradient in the Sun's Rotation. *W. A. Dziembowski, Philip R. Goode, and K. G. Libbrecht.* 337, L53, 25-E5 (1989)
- LIGHTMAN, ALAN P. Surfaces of Constant Redshift in an Inflationary Universe. *Alan P. Lightman and William H. Press.* 337, 598, 26-E1 (1989)
- LIN, D. N. C. Spectral Evolution of Accretion Disks of Dwarf Novae. II. Radiative Transfer Models. *F. H. Cheng and D. N. C. Lin.* 337, 432, 22-F1 (1989)
- LIS, DARIUSZ C. CO Isotope Studies of the Sagittarius B2 Molecular Cloud. *Dariusz C. Lis and Paul F. Goldsmith.* 337, 704, 27-F1 (1989)
- LISZT, HARVEY S. High-Resolution CO Observations of NGC 1068. *Noboru Kaneko, Kazuhiko Morita, Yasuo Fukui, Koji Sugitani, Takahiro Iwata, Naomasa Nakai, Norio Kaifu, and Harvey S. Liszt.* 337, 691, 27-E7 (1989)
- LIU, TIANXING. The Luminosity Scale of RR Lyrae Stars with the Baade-Wesselink Method. I. Photometry and Radial Velocities (Abstract of Paper in 1989 March Suppl.). *Tianxing Liu and Kenneth A. Jones.* 337, 1038, 31-E13 (1989)
- LOCHNER, JAMES C. A Search for a Dynamical Attractor in Cygnus X-1. *James C. Lochner, J. H. Swank, and A. E. Szymkowiak.* 337, 823, 29-B11 (1989)
- LOEWEINSTEIN, R. Far-Infrared and Submillimeter Photometric Mapping of Spiral Galaxies in the Virgo Cluster. *A. A. Stark, J. A. Davidson, S. Platt, D. A. Harper, R. Pernic, R. Loewenstein, S. Platt, G. Engargiola, and S. Casey.* 337, 650, 27-B1 (1989)
- LOPES, DALTON F. The Chemical Composition of the Emitting Gas in HM Sagittae. *J. A. De Freitas Pacheco, S. J. Codina-Landaberry, and Dalton F. Lopes.* 337, 520, 24-A1 (1989)
- MAC LOW, MORDECAI-MARK. Superbubble Blowout Dynamics. *Mordecai-Mark Mac Low, Richard McCray, and Michael L. Norman.* 337, 141, 19-A1 (1989)
- MARR, J. M. A Fast-moving Knot of Radio Emission in the Active Galaxy NGC 1275. *J. M. Marr, D. C. Backer, M. C. H. Wright, A. C. S. Readhead, and R. Moore.* 337, 671, 27-D1 (1989)
- MASI, S. Infrared Emission from Interplanetary Dust. *P. Temi, P. De Bernardis, S. Masi, G. Moreno, and A. Salama.* 337, 528, 24-B1 (1989)
- MASSEY, PHILIP. Spectroscopic Studies of Wolf-Rayet Stars. IV. Optical Spectrophotometry of the Emission Lines in Galactic and Large Magellanic Cloud Stars. *Peter S. Conti and Philip Massey.* 337, 251, 20-D12 (1989)
- MASSON, C. R. Interferometric C¹⁸O Observations of DR 21(OH) and L1551 IRS 5 at $\gamma = 1.4$ Millimeters. *S. Padin, A. I. Sargent, L. G. Mundy, N. Z. Scoville, D. P. Woody, R. B. Leighton, C. R. Masson, S. L. Scott, T. V. Seling, K. R. Stapelfeldt, and S. Terebey.* 337, L45, 25-D9 (1989)
- MAZA, JOSÉ. Spectrophotometry of Calán-Tololo Seyfert Galaxies: Objects from List I (Abstract of Paper in 1989 March Suppl.). *José Maza and María Teresa Ruiz.* 337, 1036, 31-E11 (1989)
- Calán-Tololo Survey. I. Seyfert 1 Galaxies (Abstract of Paper in 1989 March Suppl.). *José Maza, María Teresa Ruiz, Luis E. González, and Marina Wischnjewsky.* 337, 1036, 31-E11 (1989)
- McCGRAY, RICHARD. Superbubble Blowout Dynamics. *Mordecai-Mark Mac Low, Richard McCray, and Michael L. Norman.* 337, 141, 19-A1 (1989)
- MCINTOSH, G. C. VLBI and Polarimetric Observations of the SiO Masers in R Cassiopeiae. *G. C. McIntosh, C. R. Predmore, J. M. Moran, L. J. Greenhill, A. E. E. Rogers, and R. Barvainis.* 337, 934, 30-D9 (1989)
- MÉSZÁROS, P. The Effect of Stimulated Scattering in Compact Sources. *P. Mészáros, G. G. Pavlov, and Yu. A. Shibanov.* 337, 426, 22-E7 (1989)
- Magnetized Neutron Stars as Gamma-Ray Bursters: Detection Rates at High Energies. *P. Mészáros, Z. Bagoly, and H. Ritter.* 337, L23, 25-C1 (1989)
- MEWALDT, R. A. Isotope Abundances of Solar Coronal Material Derived from Solar Energetic Particle Measurements. *R. A. Mewaldt and E. C. Stone.* 337, 959, 30-F6 (1989)
- MICHALITSIANOS, A. G. RX Puppis: Detection of Asymmetrical Radio Structure. *J. M. Hollis, F. Yusef-Zadeh, T. J. Cornwell, R. J. Oliver, A. G. Michalitsianos, and M. Kafatos.* 337, 514, 23-G9 (1989)
- MIDDLEITCH, J. A Third X-Ray Spectral Mode in Scorpius X-1: Similarities to the Other Bright Bulge Sources. *G. Hasinger, W. C. Priedhorsky, and J. Middleitch.* 337, 843, 29-D4 (1989)
- MILGROM, MORDEHAI. Light Reprocessing in the Echo Model of Luminous Arcs. *Erez Braun and Mordehai Milgrom.* 337, 644, 27-A9 (1989)
- MIRABEL, I. FÉLIX. VLA Observations of the High-Velocity Bipolar OH Absorption in L1551. *Luis F. Rodriguez, Jorge Cantó, I. Félix Mirabel, and Abraham Ruiz.* 337, 712, 27-G1 (1989)
- MOFFAT, ANTHONY F. J. Slow Expansion of the Shell of the Recurrent Nova T Pyxidis and Detection of a Faint Extended Envelope. *Michael M. Shara, Anthony F. J. Moffat, Robert E. Williams, and Judith G. Cohen.* 337, 720, 28-A1 (1989)
- MONETI, A. Near-Infrared Images of the Bipolar Nebula OH 0739 – 14. *C. E. Woodward, W. J. Forrest, J. L. Pipher, A. Moneti, and M. A. Shure.* 337, 754, 28-D2 (1989)
- MONTESINOS, BENJAMÍN. Siphon Flows in Isolated Magnetic Flux Tubes. II. Adiabatic Flows. *Benjamín Montesinos and John H. Thomas.* 337, 97, 31-A1 (1989)
- MOORE, R. A Fast-moving Knot of Radio Emission in the Active Galaxy NGC 1275. *J. M. Marr, D. C. Backer, M. C. H. Wright, A. C. S. Readhead, and R. Moore.* 337, 671, 27-D1 (1989)
- MORAN, J. M. VLBI and Polarimetric Observations of the SiO Masers in R Cassiopeiae. *G. C. McIntosh, C. R. Predmore, J. M. Moran, L. J. Greenhill, A. E. E. Rogers, and R. Barvainis.* 337, 934, 30-D9 (1989)
- MORENO, G. Infrared Emission from Interplanetary Dust. *P. Temi, P. De Bernardis, S. Masi, G. Moreno, and A. Salama.* 337, 528, 24-B1 (1989)
- MORITA, KAZUHIKO. High-Resolution CO Observations of NGC 1068. *Noboru Kaneko, Kazuhiko Morita, Yasuo Fukui, Koji Sugitani, Takahiro Iwata, Naomasa Nakai, Norio Kaifu, and Harvey S. Liszt.* 337, 691, 27-E7 (1989)
- MULLAN, D. J. g-Mode Pulsations in Polytropes: High-Precision Eigenvalues and the Approach to Asymptotic Behavior. *D. J. Mullan.* 337, 1017, 31-D4 (1989)
- MUNDY, L. G. Interferometric Observations of 1.4 Millimeter Continuum Sources. *D. P. Woody, S. L. Scott, N. Z. Scoville, L. G. Mundy, A. I. Sargent, S. Padin, C. G. Tinney, and C. D. Wilson.* 337, L41, 25-D5 (1989)
- Interferometric C¹⁸O Observations of DR 21(OH) and L1551 IRS 5 at $\gamma = 1.4$ Millimeters. *S. Padin, A. I. Sargent, L. G. Mundy, N. Z. Scoville, D. P. Woody, R. B. Leighton, C. R. Masson, S. L. Scott, T. V. Seling, K. R. Stapelfeldt, and S. Terebey.* 337, L45, 25-D9 (1989)
- MUSIELAK, Z. E. On the Generation of Flux Tube Waves in Stellar Convection Zones. I. Longitudinal Tube Waves Driven by External Turbulence. *Z. E. Musielak, R. Rosner, and P. Ulmschneider.* 337, 470, 23-D1 (1989)
- MUTEL, R. L. VLBI Angular Broadening Measurements in the Cygnus Region. *A. L. Fey, S. R. Spangler, and R. L. Mutel.* 337, 730, 28-B1 (1989)
- NAKAI, NAOMASA. High-Resolution CO Observations of NGC 1068. *Noboru Kaneko, Kazuhiko Morita, Yasuo Fukui, Koji Sugitani, Takahiro Iwata, Naomasa Nakai, Norio Kaifu, and Harvey S. Liszt.* 337, 691, 27-E7 (1989)
- NAKAMURA, T. Rotating Stellar Collapse Model for Supernova SN 1987A. *T. Nakamura and M. Fukugita.* 337, 466, 23-C8 (1989)
- NATH, BIMAN B. On the Explosive Origin Hypothesis for Present-Day Cosmic Voids and Peculiar Velocities. *Biman B. Nath and David Eichler.* 337, 1, 17-A9 (1989)
- NISHIDA, MINORU. Brackett α and γ Observations of Starburst and Seyfert Galaxies. *Kimiaki Kawara, Minoru Nishida, and M. M. Phillips.* 337, 230, 20-C1 (1989)
- NITTA, NARIAKI. The Spatial, Spectral, and Temporal Character of the Hard X-Ray Flare of 1982 February 3. *Nariaki Nitta, Alan L. Kiplinger, and Keizo Kai.* 337, 1003, 31-C2 (1989)
- NORMAN, MICHAEL L. Superbubble Blowout Dynamics. *Mordecai-Mark Mac Low, Richard McCray, and Michael L. Norman.* 337, 141, 19-A1 (1989)
- NORRIS, JOHN E. Population Studies. VI. The Transition from Halo to Thin Disk. *John E. Norris and E. M. Green.* 337, 272, 20-F9 (1989)
- O'BRIEN, ESTELA V. Using Far-Infrared Limb Brightening to Probe Isolated Dark Globules. *Chun Ming Leung, Estela V. O'Brien, and Russell Dubisch.* 337, 293, 21-A9 (1989)
- OKAMURA, SADANORI. Discovery of a Bright X-Ray Nova, GS 2000 + 25. *Hiroshi Tsunemi, Shunji Kitamoto, Sadanori Okamura, and Diane Roussel-Dupré.* 337, L81, 32-C1 (1989)
- OLIVERSEN, R. J. RX Puppis: Detection of Asymmetrical Radio Struc-

- ture. *J. M. Hollis, F. Yusef-Zadeh, T. J. Cornwell, R. J. Oliversen, A. G. Michalitsianos, and M. Kafatos.* 337, 514, 23-G9 (1989)
- The Outer R Aquarii Nebula: Comparison of 6 Centimeter Radio Continuum and Balmer Line Emission. *J. M. Hollis, R. J. Oliversen, and R. Mark Wagner.* 337, 795, 28-G4 (1989)
- OLIVI, FABRIZIO M. Models of Spectral Energy Distributions of Elliptical Galaxies. *Guido Barbaro and Fabrizio M. Olivi.* 337, 125, 18-F6 (1989)
- OSTRIKER, JEREMIAH P. The Velocity Dispersion of the Giant Molecular Clouds: A Viscous Origin; Erratum. *Chanda J. Jog and Jeremiah P. Ostriker.* 337, 1035, 31-E8 (1989) (Orig. paper in 328, 404, 67-D10)
- PACZYNSKI, BOHDAN. Gravitational Lensing by a Smoothly Variable Surface Mass Density. *Bohdan Paczyński and Joachim Wambsganss.* 337, 581, 26-C1 (1989)
- PADIN, S. Interferometric Observations of 1.4 Millimeter Continuum Sources. *D. P. Woody, S. L. Scott, N. Z. Scoville, L. G. Mundy, A. I. Sargent, S. Padin, C. G. Tinney, and C. D. Wilson.* 337, L41, 25-D5 (1989)
- INTERFEROMETRIC $C^{18}O$ OBSERVATIONS OF DR 21(OH) AND L1551 IRS 5 AT $\gamma = 1.4$ MILLIMETERS. *S. Padin, A. I. Sargent, L. G. Mundy, N. Z. Scoville, D. P. Woody, R. B. Leighton, C. R. Masson, S. L. Scott, T. V. Selig, K. R. Stapelfeldt, and S. Tereby.* 337, L45, 25-D9 (1989)
- PARESCHE, FRANCESCO. The Structure of the Beta Pictoris Circumstellar Disk From Combined IRAS and Coronagraphic Observations. *Pawel Artymowicz, Christopher Burrows, and Francesco Paresce.* 337, 494, 23-F1 (1989)
- HIGH-RESOLUTION CORONAGRAPHY OF THE CIRCUMSTELLAR ENVIRONMENT OF SN 1987A. *Francesco Paresce and Christopher Burrows.* 337, L13, 25-B6 (1989)
- PARK, SEOK JAE. An Axisymmetric, Nonstationary Model of the Central Engine in an Active Galactic Nucleus. I. Black Hole Electrodynamics. *Seok Jae Park and Ethan T. Vishniac.* 337, 78, 18-A7 (1989)
- PAVLOV, G. G. The Effect of Stimulated Scattering in Compact Sources. *P. Mészáros, G. G. Pavlov, and Yu. A. Shibanov.* 337, 426, 22-E7 (1989)
- PEACOCK, A. Non-Equilibrium Ionization Effects in the Supernova Remnant RCW 86. *J. J. Claas, A. Smith, J. S. Kaastra, P. A. J. de Korte, and A. Peacock.* 337, 399, 22-C6 (1989)
- PEI, YICHUAN C. Limits on Dust in Damped Lyman-Alpha Systems and the Obscuration of Quasars. *S. Michael Fall and Yichuan C. Pei.* 337, 7, 17-B1 (1989)
- PELLAT, R. Bars and Barred Spirals: Linear Theory Revisited. *M. Tagger, J. F. Synjet, and R. Pellat.* 337, L9, 25-B1 (1989)
- PERINOTTO, M. Fast Winds from the Central Stars of NGC 6543 and NGC 6826. *M. Perinotto, M. Cerruti-Sola, and H. J. G. L. M. Lamers.* 337, 382, 22-B1 (1989)
- PERNIC, R. Far-Infrared and Submillimeter Photometric Mapping of Spiral Galaxies in the Virgo Cluster. *A. A. Stark, J. A. Davidson, S. Platt, D. A. Harper, R. Pernic, R. Loewenstein, S. Platt, G. Engargiola, and S. Casey.* 337, 650, 27-B1 (1989)
- PETERSON, J. B. Anisotropy of the Diffuse Background at Millimeter Wavelengths. *G. M. Bernstein, M. L. Fischer, P. L. Richards, J. B. Peterson, and T. Timusk.* 337, L1, 25-A6 (1989)
- PETROSIAN, VAHE. Cosmological Parameters and Evolution of the Galaxy Luminosity Function. *David Caditz and Vahé Petrosian.* 337, L65, 32-A10 (1989)
- PHILLIPS, M. M. Brackett α and β Observations of Starburst and Seyfert Galaxies. *Kimiaki Kawara, Minoru Nishida, and M. M. Phillips.* 337, 230, 20-C1 (1989)
- PIPIER, J. L. Near-Infrared Images of the Bipolar Nebula OH 0739 - 14. *C. E. Woodward, W. J. Forrest, J. L. Pipher, A. Moneti, and M. A. Shure.* 337, 754, 28-D2 (1989)
- PLATT, S. Far-Infrared and Submillimeter Photometric Mapping of Spiral Galaxies in the Virgo Cluster. *A. A. Stark, J. A. Davidson, S. Platt, D. A. Harper, R. Pernic, R. Loewenstein, S. Platt, G. Engargiola, and S. Casey.* 337, 650, 27-B1 (1989)
- FAR-INFRARED AND SUBMILLIMETER PHOTOMETRIC MAPPING OF SPIRAL GALAXIES IN THE VIRGO CLUSTER. *A. A. Stark, J. A. Davidson, S. Platt, D. A. Harper, R. Pernic, R. Loewenstein, S. Platt, G. Engargiola, and S. Casey.* 337, 650, 27-B1 (1989)
- POE, CLINT H. A Rotating, Magnetic, Radiation-driven Wind Model for Wolf-Rayet Stars. *Clint H. Poe, David B. Friend, and Joseph P. Cassinelli.* 337, 888, 30-A1 (1989)
- PRASAD, C. V. V. The First Negative ($B^2 \Sigma_u^+ - X^2 \Sigma_g^+$) System of $^{15}\text{N}_2^+$. *S. Paddi Reddi and C. V. V. Prasad.* 337, 579, 24-F5 (1989) (Orig. paper in 331, 572, 112-F8)
- PREDMORE, C. R. VLBI and Polarimetric Observations of the SiO Masers in R Cassiopeiae. *G. C. McIntosh, C. R. Predmore, J. M. Moran, L. J. Greenhill, A. E. E. Rogers, and R. Barnaïn.* 337, 934, 30-D9 (1989)
- PRESS, WILLIAM H. Surfaces of Constant Redshift in an Inflationary Universe. *Alan P. Lightman and William H. Press.* 337, 598, 26-E1
- PRICE, JILL S. Optical and Infrared Surface Photometry of NGC 3077. *Jill S. Price and Craig A. Gullixson.* 337, 658, 27-B10 (1989)
- PRIEDHORSKY, W. C. A Third X-Ray Spectral Mode in Scorpius X-1: Similarities to the Other Bright Bulge Sources. *G. Hasinger, W. C. Priehorsky, and J. Middlecamp.* 337, 843, 29-D4 (1989)
- PRINJA, RAMAN K. The Stellar Winds of 203 Galactic O Stars: A Quantitative Ultraviolet Survey (Abstract of Paper in 1989 March Suppl.). *Ian D. Howarth and Raman K. Prinja.* 337, 1037, 31-E12 (1989)
- RAYMOND, J. C. Wind-Disk Shocks around T Tauri Stars. *L. Hartmann and J. C. Raymond.* 337, 903, 30-B6 (1989)
- READHEAD, A. C. S. A Fast-moving Knot of Radio Emission in the Active Galaxy NGC 1275. *J. M. Marr, D. C. Backer, M. C. H. Wright, A. C. S. Readhead, and R. Moore.* 337, 671, 27-D1 (1989)
- REDDI, S. PADDI. The First Negative ($B^2 \Sigma_u^+ - X^2 \Sigma_g^+$) System of $^{15}\text{N}_2^+$. *S. Paddi Reddi and C. V. V. Prasad.* 337, 579, 24-F5 (1989) (Orig. paper in 331, 572, 112-F8)
- RICHARDS, P. L. Anisotropy of the Diffuse Background at Millimeter Wavelengths. *G. M. Bernstein, M. L. Fischer, P. L. Richards, J. B. Peterson, and T. Timusk.* 337, L1, 25-A6 (1989)
- RIFFERT, H. Magnetized Neutron Stars as Gamma-Ray Bursters: Detection Rates at High Energies. *P. Mészáros, Z. Bagoly, and H. Riffert.* 337, L23, 25-C1 (1989)
- RODRIGUEZ, LUIS F. VLA Observations of the High-Velocity Bipolar OH Absorption in L1551. *Luis F. Rodriguez, Jorge Cantó, I. Félix Mirabel, and Abraham Ruiz.* 337, 712, 27-G1 (1989)
- ROGERS, A. E. E. VLBI and Polarimetric Observations of the SiO Masers in R Cassiopeiae. *G. C. McIntosh, C. R. Predmore, J. M. Moran, L. J. Greenhill, A. E. E. Rogers, and R. Barnaïn.* 337, 934, 30-D9 (1989)
- ROMANISHIN, W. A Spiral Galaxy at $z = 0.366$ Which Overlaps the Image of the Quasar 4C 39.47. *Paul Hintzen, W. Romanishin, Craig Foltz, and William Keel.* 337, L5, 25-A10 (1989)
- ROSE, WILLIAM K. Magnetic Fields in Extragalactic Jets. II. Specific Models and Radiative Processes. *William K. Rose.* 337, 91, 18-B12 (1989)
- ROSNER, R. On the Generation of Flux Tube Waves in Stellar Convection Zones. I. Longitudinal Tube Waves Driven by External Turbulence. *Z. E. Musielak, R. Rosner, and P. Ulmschneider.* 337, 470, 23-D1 (1989)
- ROUSSEL-DUPRÉ, DIANE. Discovery of a Bright X-Ray Nova, GS 2000 + 25. *Hiroshi Tsunemi, Shunji Kitamoto, Sadanori Okamura, and Diane Roussel-Dupré.* 337, L81, 32-C1 (1989)
- RUDERMAN, MALVIN. Period Difference between X-Ray and Very High Energy Gamma-Ray Observations of Accreting X-Ray Pulsars. *K. S. Cheng and Malvin Ruderman.* 337, L77, 32-B10 (1989)
- RUIZ, ABRAHAM. VLA Observations of the High-Velocity Bipolar OH Absorption in L1551. *Luis F. Rodriguez, Jorge Cantó, I. Félix Mirabel, and Abraham Ruiz.* 337, 712, 27-G1 (1989)
- RUIZ, MARÍA TERESA. Spectrophotometry of Calán-Tololo Seyfert Galaxies: Objects from List 1 (Abstract of Paper in 1989 March Suppl.). *José Maza and María Teresa Ruiz.* 337, 1036, 31-E11 (1989)
- Calán-Tololo Survey. I. Seyfert 1 Galaxies (Abstract of Paper in 1989 March Suppl.). *José Maza, María Teresa Ruiz, Luis E. González, and Marina Wischnjewsky.* 337, 1036, 31-E11 (1989)
- RUPEN, MICHAEL R. VLBI Observations of SN 1986J: Deviations from Spherical Symmetry in Its Radio Brightness Distribution. *Norbert Bartel, Michael R. Rupen, and Irwin I. Shapiro.* 337, L85, 32-C7 (1989)
- RYU, DONGSU. On the Stability of Decelerating Shocks. *Ethan T. Vishniac and Dongsu Ryu.* 337, 917, 30-C6 (1989)
- SAAR, S. H. Relations between the Photospheric Magnetic Field and the Emission from the Outer Atmospheres of Cool Stars. I. The Solar Ca II K Line Core Emission. *C. J. Schrijver, J. Coté, C. Zwaan, and S. H. Saar.* 337, 964, 30-F12 (1989)
- SAALMA, A. Infrared Emission from Interplanetary Dust. *P. Temi, P. De Bernardis, S. Masi, G. Moreno, and A. Salama.* 337, 528, 24-B1 (1989)
- SALVADOR-SOLÉ, E. Three-dimensional Morphological Segregation in Rich Clusters of Galaxies. *E. Salvador-Solé, M. Sanromán, and J. J. Rdz. Jordana.* 337, 636, 27-A1 (1989)
- SANROMÁN, M. Three-dimensional Morphological Segregation in Rich Clusters of Galaxies. *E. Salvador-Solé, M. Sanromán, and J. J. Rdz. Jordana.* 337, 636, 27-A1 (1989)
- SANTOS, N. O. Density Constraints on Local Inhomogeneity in Cosmology. *J. Eisenstaedt and N. O. Santos.* 337, 601, 26-E4 (1989)
- SARGENT, A. I. Interferometric Observations of 1.4 Millimeter Continuum Sources. *D. P. Woody, S. L. Scott, N. Z. Scoville, L. G. Mundy,*

- A. I. Sargent, S. Padin, C. G. Tinney, and C. D. Wilson.* 337, L41, 25-D5 (1989)
- Interferometric $C^{18}O$ Observations of DR 21(OH) and L1551 IRS 5 at $\gamma = 1.4$ Millimeters. *S. Padin, A. I. Sargent, L. G. Mundy, N. Z. Scoville, D. P. Woody, R. B. Leighton, C. R. Masson, S. L. Scott, T. V. Seling, K. R. Stapelfeldt, and S. Terebey.* 337, L45, 25-D9 (1989)
- SASSELOV, DIMITAR D. Infrared Spectroscopy of Cepheids: Peculiar Velocity Structure and Its Effect on Radii and Distances. *Dimitar D. Sasselov, John B. Lester, and Michael S. Fieldus.* 337, L29, 25-C7 (1989)
- SCHAFFER, BRADLEY E. Flashes from Normal Stars. *Bradley E. Schaefer.* 337, 927, 30-D2 (1989)
- SCHLOERB, F. PETER. Comparison of the Far-Infrared and Carbon Monoxide Emission in Heiles' Cloud 2 and B18. *Ronald L. Snell, Mark H. Heyer, and F. Peter Schloerb.* 337, 739, 28-C1 (1989)
- SCHNEIDER, PETER. A Gravitational Lens Explanation for the Arclike Structure in Cl 0500 - 24. *Joachim Wambsganss, Edmond Giraud, Peter Schneider, and Achim Weiss.* 337, L73, 32-B5 (1989)
- SCHRIJVER, C. J. Relations between the Photospheric Magnetic Field and the Emission from the Outer Atmospheres of Cool Stars. I. The Solar Ca II K Line Core Emission. *C. J. Schrijver, J. Coté, C. Zwaan, and S. H. Saar.* 337, 964, 30-F12 (1989)
- SCHULTE-LADBECK, REGINA E. Polarimetry of Four Wolf-Rayet Stars. *Regina E. Schulte-Ladbeck and Karel A. van der Hucht.* 337, 872, 29-F10 (1989)
- SCOTT, S. L. Interferometric Observations of 1.4 Millimeter Continuum Sources. *D. P. Woody, S. L. Scott, N. Z. Scoville, L. G. Mundy, A. I. Sargent, S. Padin, C. G. Tinney, and C. D. Wilson.* 337, L41, 25-D5 (1989)
- Interferometric $C^{18}O$ Observations of DR 21(OH) and L1551 IRS 5 at $\gamma = 1.4$ Millimeters. *S. Padin, A. I. Sargent, L. G. Mundy, N. Z. Scoville, D. P. Woody, R. B. Leighton, C. R. Masson, S. L. Scott, T. V. Seling, K. R. Stapelfeldt, and S. Terebey.* 337, L45, 25-D9 (1989)
- SCOVILLE, N. Z. Interferometric Observations of 1.4 Millimeter Continuum Sources. *D. P. Woody, S. L. Scott, N. Z. Scoville, L. G. Mundy, A. I. Sargent, S. Padin, C. G. Tinney, and C. D. Wilson.* 337, L41, 25-D5 (1989)
- Interferometric $C^{18}O$ Observations of DR 21(OH) and L1551 IRS 5 at $\gamma = 1.4$ Millimeters. *S. Padin, A. I. Sargent, L. G. Mundy, N. Z. Scoville, D. P. Woody, R. B. Leighton, C. R. Masson, S. L. Scott, T. V. Seling, K. R. Stapelfeldt, and S. Terebey.* 337, L45, 25-D9 (1989)
- SELING, T. V. Interferometric $C^{18}O$ Observations of DR 21(OH) and L1551 IRS 5 at $\gamma = 1.4$ Millimeters. *S. Padin, A. I. Sargent, L. G. Mundy, N. Z. Scoville, D. P. Woody, R. B. Leighton, C. R. Masson, S. L. Scott, T. V. Seling, K. R. Stapelfeldt, and S. Terebey.* 337, L45, 25-D9 (1989)
- SHAPIRO, IRWIN I. VLBI Observations of SN 1986J: Deviations from Spherical Symmetry in Its Radio Brightness Distribution. *Norbert Bartel, Michael R. Rupen, and Irwin I. Shapiro.* 337, L85, 32-C7 (1989)
- SHAPIRO, STUART L. Supernova 1987A and the Emergence of the Hot Neutron Star: A Semianalytic Approach. *David F. Chernoff, Stuart L. Shapiro, and Ira Wasserman.* 337, 814, 29-B1 (1989)
- SHARA, MICHAEL M. Slow Expansion of the Shell of the Recurrent Nova T Pyxidis and Detection of a Faint Extended Envelope. *Michael M. Shara, Anthony F. J. Moffat, Robert E. Williams, and Judith G. Cohen.* 337, 720, 28-A1 (1989)
- SHAW, RICHARD A. Apparent Magnitudes of Luminous Planetary Nebula Nuclei. II. A Survey of Southern Hemisphere Planetary Nebulae (Abstract of Paper in 1989 March Suppl.). *Richard A. Shaw and James B. Kaler.* 337, 1037, 31-E12 (1989)
- SHIBANOV, YU. A. The Effect of Stimulated Scattering in Compact Sources. *P. Mészáros, G. G. Pavlov, and Yu. A. Shibanov.* 337, 426, 22-E7 (1989)
- SHURE, M. A. Near-Infrared Images of the Bipolar Nebula OH 0739 - 14. *C. E. Woodward, W. J. Forrest, J. L. Pipher, A. Moneti, and M. A. Shure.* 337, 754, 28-D2 (1989)
- SIKORA, MAREK. Self-absorbed Synchrotron Sources in Active Galactic Nuclei. *Martijn de Kool, Mitchell C. Begelman, and Marek Sikora.* 337, 66, 17-G5 (1989)
- SIMON, M. Lunar Occultations of *IRAS* Point Sources, 1991-2000 (Abstract of Paper in 1989 March Suppl.). *L. Cassar, W. P. Chen, and M. Simon.* 337, 1038, 31-E13 (1989)
- SMITH, A. Non-Equilibrium Ionization Effects in the Supernova Remnant RCW 86. *J. J. Claas, A. Smith, J. S. Kaastra, P. A. J. de Korte, and A. Peacock.* 337, 399, 22-C6 (1989)
- SMITH, DEAN F. Minimum Mach Number for Impulsive Proton Acceleration by Parallel Collisionless Shock Waves in Solar Flares. *Dean F. Smith and Stephen H. Brecht.* 337, 954, 30-F1 (1989)
- SMITH, ERIC P. Multicolor Surface Photometry of Powerful Radio Galaxies. I. Observations and Data Reduction (Abstract of Paper in 1989 March Suppl.). *Eric P. Smith and T. M. Heckman.* 337, 1036, 31-E11 (1989)
- SNELL, RONALD L. CO in Optically Selected Starburst Galaxies. *James M. Jackson, Ronald L. Snell, Paul T. P. Ho, and Alan H. Barrett.* 337, 680, 27-D10 (1989)
- Comparison of the Far-Infrared and Carbon Monoxide Emission in Heiles' Cloud 2 and B18. *Ronald L. Snell, Mark H. Heyer, and F. Peter Schloerb.* 337, 739, 28-C1 (1989)
- SOOD, R. Hard X-Ray Spectrum of Supernova 1987A on Day 407. *P. Ubertini, A. Bazzano, R. Sood, R. Staubert, T. J. Sumner, and G. Frye.* 337, L19, 25-B1 (1989)
- SPANGLER, S. R. VLBI Angular Broadening Measurements in the Cygnus Region. *A. L. Fey, S. R. Spangler, and R. L. Mutel.* 337, 730, 28-B1 (1989)
- STAPELFELDT, K. R. Interferometric $C^{18}O$ Observations of DR 21(OH) and L1551 IRS 5 at $\gamma = 1.4$ Millimeters. *S. Padin, A. I. Sargent, L. G. Mundy, N. Z. Scoville, D. P. Woody, R. B. Leighton, C. R. Masson, S. L. Scott, T. V. Seling, K. R. Stapelfeldt, and S. Terebey.* 337, L45, 25-D9 (1989)
- STARKE, A. A. Far-Infrared and Submillimeter Photometric Mapping of Spiral Galaxies in the Virgo Cluster. *A. A. Stark, J. A. Davidson, S. Platt, D. A. Harper, R. Pernic, R. Loewenstein, S. Platt, G. Engargiola, and S. Casey.* 337, 650, 27-B1 (1989)
- STAUBERT, R. Hard X-Ray Spectrum of Supernova 1987A on Day 407. *P. Ubertini, A. Bazzano, R. Sood, R. Staubert, T. J. Sumner, and G. Frye.* 337, L19, 25-B1 (1989)
- STENCIL, ROBERT E. Line Identifications in the Ultraviolet Spectrum of 31 Cygni (Abstract of Paper in 1989 March Suppl.). *Wendy Hagen Bauer and Robert E. Stencil.* 337, 1038, 31-E13 (1989)
- STONE, E. C. Isotope Abundances of Solar Coronal Material Derived from Solar Energetic Particle Measurements. *R. A. Mewaldt and E. C. Stone.* 337, 959, 30-F6 (1989)
- SUÈSS, S. T. Magnetohydrodynamic Instabilities in Coronal Arcades. *Chang-Hyun An, S. T. Suess, and S. T. Wu.* 337, 989, 31-B1 (1989)
- SUGITANI, KOJI. High-Resolution CO Observations of NGC 1068. *Noboru Kaneko, Kazuhiko Morita, Yasuo Fukui, Koji Sugitani, Takahiro Iwata, Naomasa Nakai, Norio Kaifu, and Harvey S. Liszt.* 337, 691, 27-E7 (1989)
- SUMNER, T. J. Hard X-Ray Spectrum of Supernova 1987A on Day 407. *P. Ubertini, A. Bazzano, R. Sood, R. Staubert, T. J. Sumner, and G. Frye.* 337, L19, 25-B1 (1989)
- SUNDAR, R. RAJAN. The Accretion of Interplanetary Dust by Ap and Am Stars. *C. Krishna Kumar, Joseph M. Davila, and R. Rajan Sundar.* 337, 414, 22-D9 (1989)
- SWANK, J. H. A Search for a Dynamical Attractor in Cygnus X-1. *James C. Lochner, J. H. Swank, and A. E. Szymkowiak.* 337, 823, 29-B11 (1989)
- SYGNET, J. F. Bars and Barred Spirals: Linear Theory Revisited. *M. Tagger, J. F. Sygnet, and R. Pellat.* 337, L9, 25-B1 (1989)
- SZYMKOPIAK, A. E. A Search for a Dynamical Attractor in Cygnus X-1. *James C. Lochner, J. H. Swank, and A. E. Szymkowiak.* 337, 823, 29-B11 (1989)
- TAAM, RONALD E. Double-Core Evolution. III. The Evolution of a $5 M_{\odot}$ Red Giant with a $1 M_{\odot}$ Companion. *Ronald E. Taam and Peter Bodenheimer.* 337, 849, 29-E1 (1989)
- TAGGER, M. Bars and Barred Spirals: Linear Theory Revisited. *M. Tagger, J. F. Sygnet, and R. Pellat.* 337, L9, 25-B1 (1989)
- TEMI, P. Infrared Emission from Interplanetary Dust. *P. Temi, P. De Bernardis, S. Masi, G. Moreno, and A. Salama.* 337, 528, 24-B1 (1989)
- TEREBEY, S. Interferometric $C^{18}O$ Observations of DR 21(OH) and L1551 IRS 5 at $\gamma = 1.4$ Millimeters. *S. Padin, A. I. Sargent, L. G. Mundy, N. Z. Scoville, D. P. Woody, R. B. Leighton, C. R. Masson, S. L. Scott, T. V. Seling, K. R. Stapelfeldt, and S. Terebey.* 337, L45, 25-D9 (1989)
- THOMAS, JOHN H. Siphon Flows in Isolated Magnetic Flux Tubes. II. Adiabatic Flows. *Benjamin Montesinos and John H. Thomas.* 337, 977, 31-A1 (1989)
- TIMUSK, T. Anisotropy of the Diffuse Background at Millimeter Wavelengths. *G. M. Bernstein, M. L. Fischer, P. L. Richards, J. B. Peterson, and T. Timusk.* 337, L1, 25-A6 (1989)
- TINNEY, C. G. Interferometric Observations of 1.4 Millimeter Continuum Sources. *D. P. Woody, S. L. Scott, N. Z. Scoville, L. G. Mundy, A. I. Sargent, S. Padin, C. G. Tinney, and C. D. Wilson.* 337, L41, 25-D5 (1989)
- TROLAND, T. H. Aperture Synthesis Observations of the 21 Centimeter Zeeman Effect toward Orion A. *T. H. Troland, C. Heiles, and W. M. Goss.* 337, 342, 21-E9 (1989)
- TSUNEMI, HIROSHI. Discovery of a Bright X-Ray Nova, GS 2000 + 25. *Hiroshi Tsunemi, Shunji Kitamoto, Sadanori Okamura, and Diane*

- Roussel-Dupré.* 337, L81, 32-C1 (1989)
- TUOHY, I. R. EXO 033319 – 2554.2: An Eclipsing AM Herculis System Showing Cyclotron Emission Features. *Lilia Ferrario, D. T. Wickramasinghe, Jeremy Bailey, I. R. Tuohy, and J. H. Hough.* 337, 832, 29-C7 (1989)
- UBERTINI, P. Hard X-Ray Spectrum of Supernova 1987A on Day 407. *P. Ubertini, A. Bazzano, R. Sood, R. Staubert, T. J. Sumner, and G. Frye.* 337, L19, 25-B11 (1989)
- ULMSCHNEIDER, P. On the Generation of Flux Tube Waves in Stellar Convection Zones. I. Longitudinal Tube Waves Driven by External Turbulence. *Z. E. Musielak, R. Rosner, and P. Ulmschneider.* 337, 470, 23-D1 (1989)
- VAN DER HUCHT, KAREL A. Polarimetry of Four Wolf-Rayet Stars. *Regina E. Schulte-Ladbeck and Karel A. van der Hucht.* 337, 872, 29-F10 (1989)
- VISHNIAC, ETHAN T. An Axisymmetric, Nonstationary Model of the Central Engine in an Active Galactic Nucleus. I. Black Hole Electrodynamics. *Seok Jae Park and Ethan T. Vishniac.* 337, 78, 18-A7 (1989)
- On the Stability of Decelerating Shocks. *Ethan T. Vishniac and Dongsu Ryu.* 337, 917, 30-C6 (1989)
- VOGEL, S. N. Millimeter Continuum Observations of a Massive Protostellar Core in Sagittarius B2. *J. E. Carlstrom and S. N. Vogel.* 337, 408, 22-D3 (1989)
- WAGNER, R. MARK. The Outer R Aquarii Nebula: Comparison of 6 Centimeter Radio Continuum and Balmer Line Emission. *J. M. Hollis, R. J. Oliversen, and R. Mark Wagner.* 337, 795, 28-G4 (1989)
- WAINSOFT, R. J. The Optical and Near-Infrared Distribution of Light in the Edge-on Galaxy IC 2531. *R. J. Wainscoat, K. C. Freeman, and A. R. Hyland.* 337, 163, 19-C1 (1989)
- WALSH, D. E. P. Interstellar Matter in Early-Type Galaxies. III. Radio Emission and Star Formation. *D. E. P. Walsh, G. R. Knapp, J. M. Wrobel, and D.-W. Kim.* 337, 209, 19-G9 (1989)
- WAMBSGANSS, JOACHIM. Gravitational Lensing by a Smoothly Variable Surface Mass Density. *Bohdan Paczyński and Joachim Wambsganss.* 337, 581, 26-C1 (1989)
- A Gravitational Lens Explanation for the Arclike Structure in Cl 0500 – 24. *Joachim Wambsganss, Edmond Giraud, Peter Schneider, and Achim Weiss.* 337, L73, 32-B5 (1989)
- WAMSTEKER, W. Hot Dust on the Outskirts of the Broad-Line Region in Fairall 9. *J. Clavel, W. Wamstecker, and I. S. Glass.* 337, 236, 20-C7 (1989)
- WASSERMAN, IRA. Supernova 1987A and the Emergence of the Hot Neutron Star: A Semianalytic Approach. *David F. Chernoff, Stuart L. Shapiro, and Ira Wasserman.* 337, 814, 29-B1 (1989)
- WEISS, ACHIM. A Gravitational Lens Explanation for the Arclike Structure in Cl 0500 – 24. *Joachim Wambsganss, Edmond Giraud, Peter Schneider, and Achim Weiss.* 337, L73, 32-B5 (1989)
- WEYMANN, R. J. Pressure-confined Lyman-Alpha Clouds. *E. Baron, R. F. Carswell, C. J. Hogan, and R. J. Weymann.* 337, 609, 26-F1 (1989)
- WICKRAMASINGHE, D. T. EXO 033319 – 2554.2: An Eclipsing AM Herculis System Showing Cyclotron Emission Features. *Lilia Ferrario, D. T. Wickramasinghe, Jeremy Bailey, I. R. Tuohy, and J. H. Hough.* 337, 832, 29-C7 (1989)
- WILLIAMS, ROBERT E. Slow Expansion of the Shell of the Recurrent Nova T Pyxidis and Detection of a Faint Extended Envelope. *Michael M. Shara, Anthony F. J. Moffat, Robert E. Williams, and Judith G. Cohen.* 337, 720, 28-A1 (1989)
- WILSON, C. D. Interferometric Observations of 1.4 Millimeter Continuum Sources. *D. P. Woody, S. L. Scott, N. Z. Scoville, L. G. Mundy, A. I. Sargent, S. Padin, C. G. Tinney, and C. D. Wilson.* 337, L41, 25-D5 (1989)
- WILSON, R. W. Dust and Gas Emission in Barnard 5. *W. D. Langer, R. W. Wilson, P. F. Goldsmith, and C. A. Beichman.* 337, 355, 21-F10 (1989)
- WISCHNEWSKY, MARINA. Calán-Tololo Survey. I. Seyfert 1 Galaxies (Abstract of Paper in 1989 March Suppl.). *José Maza, María Teresa Ruiz, Luis E. González, and Marina Wischnjewsky.* 337, 1036, 31-E11 (1989)
- WISE, MARK B. On the Validity of the Zeldovich Approximation. *Benjamin Grinstein and Mark B. Wise.* 337, 579, 24-F5 (1989) (Orig. paper in 320, 448, 114-C11)
- WITHBROE, GEORGE L. The Solar Wind Mass Flux. *George L. Withbroe.* 337, L49, 25-E1 (1989)
- WOOD, K. S. Further Observations of the Eclipsing X-Ray Burst Source MXB 1659 – 29. *L. R. Cominsky and K. S. Wood.* 337, 485, 23-E4 (1989)
- WOODWARD, C. E. Near-Infrared Images of the Bipolar Nebula OH 0739 – 14. *C. E. Woodward, W. J. Forrest, J. L. Pipher, A. Moneti, and M. A. Shure.* 337, 754, 28-D2 (1989)
- WOODY, D. P. Interferometric Observations of 1.4 Millimeter Continuum Sources. *D. P. Woody, S. L. Scott, N. Z. Scoville, L. G. Mundy, A. I. Sargent, S. Padin, C. G. Tinney, and C. D. Wilson.* 337, L41, 25-D5 (1989)
- Interferometric C¹⁸O Observations of DR 21(OH) and L1551 IRS 5 at $\gamma = 1.4$ Millimeters. *S. Padin, A. I. Sargent, L. G. Mundy, N. Z. Scoville, D. P. Woody, R. B. Leighton, C. R. Masson, S. L. Scott, T. V. Seling, K. R. Stapelfeldt, and S. Terebey.* 337, L45, 25-D9 (1989)
- WOOTTON, ALWYN. The Duplicity of IRAS 16293 – 2422: A Protobinary Star? *Alwyn Wootton.* 337, 858, 29-E10 (1989)
- WRIGHT, M. C. H. A Fast-moving Knot of Radio Emission in the Active Galaxy NGC 1275. *J. M. Marr, D. C. Backer, M. C. H. Wright, A. C. S. Readhead, and R. Moore.* 337, 671, 27-D1 (1989)
- WROBEL, J. M. Interstellar Matter in Early-Type Galaxies. III. Radio Emission and Star Formation. *D. E. P. Walsh, G. R. Knapp, J. M. Wrobel, and D.-W. Kim.* 337, 209, 19-G9 (1989)
- WU, S. T. Magnetohydrodynamic Instabilities in Coronal Arcades. *Chang-Hyuk An, S. T. Suess, and S. T. Wu.* 337, 989, 31-B1 (1989)
- YUSEF-ZADEH, F. RX Puppis: Detection of Asymmetrical Radio Structure. *J. M. Hollis, F. Yusef-Zadeh, T. J. Cornwell, R. J. Oliversen, A. G. Michalitsianos, and M. Kafatos.* 337, 514, 23-G9 (1989)
- ZEPF, STEPHEN E. Close Pairs of Galaxies in Deep Sky Surveys. *Stephen E. Zepf and David C. Koo.* 337, 34, 17-D6 (1989)
- ZHENG, WEI. Ionization by Line Photons and Its Effect on Hydrogen Line Ratios. *Wei Zheng.* 337, 617, 26-F9 (1989)
- ZMUIDZINAS, J. Heterodyne Spectroscopy of the $J = 17 - 16$ CO Line in Orion. *R. T. Boreiko, A. L. Betz, and J. Zmuidzinas.* 337, 332, 21-D1 (1989)
- ZWAAN, C. Relations between the Photospheric Magnetic Field and the Emission from the Outer Atmospheres of Cool Stars. I. The Solar Ca II K Line Core Emission. *C. J. Schrijver, J. Coté, C. Zwaan, and S. H. Saar.* 337, 964, 30-F12 (1989)

L
7
9

THE ASTROPHYSICAL JOURNAL
CONTENTS OF VOLUME 337, PART 1

1989 FEBRUARY 1, Number 1

	Page	Fiche
ON THE EXPLOSIVE ORIGIN HYPOTHESIS FOR PRESENT-DAY COSMIC VOIDS AND PECULIAR VELOCITIES <i>Biman B. Nath and David Eichler</i>	1	17-A9
LIMITS ON DUST IN DAMPED LYMAN-ALPHA SYSTEMS AND THE OBSCURATION OF QUASARS <i>S. Michael Fall and Yichuan C. Pei</i>	7	17-B1
THE MASS OF THE COMA CLUSTER: COMBINED X-RAY AND OPTICAL RESULTS	John P. Hughes	21
CLOSE PAIRS OF GALAXIES IN DEEP SKY SURVEYS	<i>Stephen E. Zepf and David C. Koo</i>	34
DIFFERENTIAL POPULATION SYNTHESIS OF S0 GALAXIES. II. METHODS AND RESULTS	<i>Michael D. Gregg</i>	45
SELF-ABSORBED SYNCHROTRON SOURCES IN ACTIVE GALACTIC NUCLEI <i>Martijn de Kool, Mitchell C. Begelman, and Marek Sikora</i>	66	17-G5
AN AXISYMMETRIC, NONSTATIONARY MODEL OF THE CENTRAL ENGINE IN AN ACTIVE GALACTIC NUCLEUS. I. BLACK HOLE ELECTRODYNAMICS	<i>Seok Jae Park and Ethan T. Vishniac</i>	78
BLACK HOLES OR DARK CLUSTERS IN M31 AND M32?	<i>Jeremy Goodman and Hyung Mok Lee</i>	84
MAGNETIC FIELDS IN EXTRAGALACTIC JETS. II. SPECIFIC MODELS AND RADIATIVE PROCESSES	<i>William K. Rose</i>	91
THE EFFECTS OF MAGNETIC FIELDS ON THE GROWTH OF THERMAL INSTABILITIES IN COOLING FLOWS <i>Laurence P. David and Joel N. Bregman</i>	97	18-C4
PERIODIC ORBITS IN THE SCHWARZSCHILD GALACTIC POTENTIAL	<i>Paul W. Cleary</i>	108
MODELS OF SPECTRAL ENERGY DISTRIBUTIONS OF ELLIPTICAL GALAXIES	<i>Guido Barbaro and Fabrizio M. Olivieri</i>	125
SUPERBUBBLE BLOWOUT DYNAMICS	<i>Mordecai-Mark Mac Low, Richard McCray, and Michael L. Norman</i>	141
ON THE DETERMINATION OF DISTRIBUTION FUNCTIONS BY NUMERICAL METHODS	<i>Jeffrey L. Bishop</i>	155
THE OPTICAL AND NEAR-INFRARED DISTRIBUTION OF LIGHT IN THE EDGE-ON GALAXY IC 2531 <i>R. J. Wainscoat, K. C. Freeman, and A. R. Hyland</i>	163	19-C1
HIGH-RESOLUTION NEUTRAL HYDROGEN OBSERVATIONS: THE BARRED SPIRAL GALAXY NGC 1300 <i>Martin N. England</i>	191	19-F1
INTERSTELLAR MATTER IN EARLY-TYPE GALAXIES. III. RADIO EMISSION AND STAR FORMATION <i>D. E. P. Walsh, G. R. Knapp, J. M. Wrobel, and D.-W. Kim</i>	209	19-G9
BRACKETT α AND γ OBSERVATIONS OF STARBURST AND SEYFERT GALAXIES <i>Kimiaki Kawara, Minoru Nishida, and M. M. Phillips</i>	230	20-C1
HOT DUST ON THE OUTSKIRTS OF THE BROAD-LINE REGION IN FAIRALL 9	<i>J. Clavel, W. Wamsteker, and I. S. Glass</i>	236
SPECTROSCOPIC STUDIES OF WOLF-RAYET STARS. IV. OPTICAL SPECTROPHOTOMETRY OF THE EMISSION LINES IN GALACTIC AND LARGE MAGELLANIC CLOUD STARS	<i>Peter S. Conti and Philip Massey</i>	251
POPULATION STUDIES. VI. THE TRANSITION FROM HALO TO THIN DISK	<i>John E. Norris and E. M. Green</i>	272
USING FAR-INFRARED LIMB BRIGHTENING TO PROBE ISOLATED DARK GLOBULES <i>Chun Ming Leung, Estela V. O'Brien, and Russell Dubisch</i>	293	21-A9
COLLISIONAL RATE COEFFICIENTS OF C_3H_2 AND THE DETERMINATION OF PHYSICAL CONDITIONS IN MOLECULAR CLOUDS	<i>L. W. Avery and Sheldon Green</i>	306
		21-B8

CONTENTS

	<i>Page</i>	<i>Fiche</i>
EXTREMELY HIGH-VELOCITY MOLECULAR FLOWS IN YOUNG STELLAR OBJECTS..... <i>Bon-Chul Koo</i>	318	21-C8
HETERODYNE SPECTROSCOPY OF THE J=17-16 CO LINE IN ORION <i>R. T. Boreiko, A. L. Betz, and J. Zmuidzinas</i>	332	21-D11
APERTURE SYNTHESIS OBSERVATIONS OF THE 21 CENTIMETER ZEEMAN EFFECT TOWARD ORION A <i>T. H. Troland, C. Heiles, and W. M. Goss</i>	342	21-E9
DUST AND GAS EMISSION IN BARNARD 5 <i>W. D. Langer, R. W. Wilson, P. F. Goldsmith, and C. A. Beichman</i>	355	21-F10
FAST WINDS FROM THE CENTRAL STARS OF NGC 6543 AND NGC 6826 <i>M. Perinotto, M. Cerruti-Sola, and H. J. G. L. M. Lamers</i>	382	22-B1
NON-EQUILIBRIUM IONIZATION EFFECTS IN THE SUPERNOVA REMNANT RCW 86 <i>J. J. Claas, A. Smith, J. S. Kaastra, P. A. J. de Korte, and A. Peacock</i>	399	22-C6
MILLIMETER CONTINUUM OBSERVATIONS OF A MASSIVE PROTOSTELLAR CORE IN SAGITTARIUS B2 <i>J. E. Carlstrom and S. N. Vogel</i>	408	22-D3
THE ACCRETION OF INTERPLANETARY DUST BY Ap AND Am STARS <i>C. Krishna Kumar, Joseph M. Davila, and R. Sundar Rajan</i>	414	22-D9
THE EFFECT OF STIMULATED SCATTERING IN COMPACT SOURCES <i>P. Mészáros, G. G. Pavlov, and Yu. A. Shibanov</i>	426	22-E7
SPECTRAL EVOLUTION OF ACCRETION DISKS OF DWARF NOVAE. II. RADIATIVE TRANSFER MODELS <i>F. H. Cheng and D. N. C. Lin</i>	432	22-F1
ROTATING STELLAR COLLAPSE MODEL FOR SUPERNOVA SN 1987A <i>T. Nakamura and M. Fukugita</i>	466	23-C8
ON THE GENERATION OF FLUX TUBE WAVES IN STELLAR CONVECTION ZONES. I. LONGITUDINAL TUBE WAVES DRIVEN BY EXTERNAL TURBULENCE <i>Z. E. Musielak, R. Rosner, and P. Ulmschneider</i>	470	23-D1
FURTHER OBSERVATIONS OF THE ECLIPSING X-RAY BURST SOURCE MXP 1659-29 <i>L. R. Cominsky and K. S. Wood</i>	485	23-E4
THE STRUCTURE OF THE BETA PICTORIS CIRCUMSTELLAR DISK FROM COMBINED IRAS AND CORONAGRAPHIC OBSERVATIONS <i>Pawel Artymowicz, Christopher Burrows, and Francesco Paresce</i>	494	23-F1
RX PUPPI: DETECTION OF ASYMMETRICAL RADIO STRUCTURE <i>J. M. Hollis, F. Yusef-Zadeh, T. J. Cornwell, R. J. Oliversen, A. G. Michalitsianos, and M. Kafatos</i>	514	23-G9
THE CHEMICAL COMPOSITION OF THE EMITTING GAS IN HM SAGITTAE <i>J. A. De Freitas Pacheco, S. J. Codina-Landaberry, and Dalton F. Lopes</i>	520	24-A1
INFRARED EMISSION FROM INTERPLANETARY DUST..... <i>P. Temi, P. De Bernardis, S. Masi, G. Moreno, and A. Salama</i>	528	24-B1
SOLAR ATMOSPHERIC DYNAMICS. III. THE EFFECT OF ACOUSTIC WAVES ON THE Mg II k LINE PROFILE <i>Pierre Gouttebroze</i>	536	24-B12
THE THEORY OF MAGNETOHYDRODYNAMIC WAVE GENERATION BY LOCALIZED SOURCES. I. GENERAL ASYMPTOTIC THEORY..... <i>William Collins</i>	548	24-C12
INTERMEDIATE-TERM SOLAR PERIODICITIES: 100-500 DAYS..... <i>J. L. Lean and G. E. Brueckner</i>	568	24-E8
ERRATA		
THE FIRST NEGATIVE ($B^2\Sigma_u^+ - X^2\Sigma_g^+$) SYSTEM OF $^{15}\text{N}_2^+$ <i>S. Paddi Reddy and C. V. V. Prasad</i>	579	24-F5
ON THE VALIDITY OF THE ZEL'DOVICH APPROXIMATION <i>Benjamin Grinstein and Mark B. Wise</i>	579	24-F5
INSTRUCTIONS TO AUTHORS.....	i	24-F6

1989 FEBRUARY 15, Number 2

GRAVITATIONAL LENSING BY A SMOOTHLY VARIABLE SURFACE MASS DENSITY <i>Bohdan Paczyński and Joachim Wambsganss</i>	581	26-C1
SURFACES OF CONSTANT REDSHIFT IN AN INFLATIONARY UNIVERSE..... <i>Alan P. Lightman and William H. Press</i>	598	26-E1
DENSITY CONSTRAINTS ON LOCAL INHOMOGENEITY IN COSMOLOGY <i>J. Eisenstaedt and N. O. Santos</i>	601	26-E4

CONTENTS

v

	Page	Fiche
PRIMORDIAL HELIUM PRODUCTION BY PREGALACTIC ACCRETING BLACK HOLES	<i>Liping Jin</i>	603
PRESSURE-CONFINED LYMAN-ALPHA CLOUDS	<i>E. Baron, R. F. Carswell, C. J. Hogan, and R. J. Weymann</i>	609
IONIZATION BY LINE PHOTONS AND ITS EFFECT ON HYDROGEN LINE RATIOS	<i>Wei Zheng</i>	617
DIAGNOSTICS OF COMPACT CLUSTERS OF GALAXIES BY GIANT LUMINOUS ARCS	<i>Israel Kovner</i>	621
THREE-DIMENSIONAL MORPHOLOGICAL SEGREGATION IN RICH CLUSTERS OF GALAXIES <i>E. Salvador-Solé, M. Sanromà, and J. J. Rdz. Jordana</i>	636	27-A1
LIGHT REPROCESSING IN THE ECHO MODEL OF LUMINOUS ARCS	<i>Erez Braun and Mordehai Milgrom</i>	644
FAR-INFRARED AND SUBMILLIMETER PHOTOMETRIC MAPPING OF SPIRAL GALAXIES IN THE VIRGO CLUSTER <i>A. A. Stark, J. A. Davidson, D. A. Harper, R. Pernic, R. Loewenstein, S. Platt, G. Engargiola, and S. Casey</i>	650	27-B1
OPTICAL AND INFRARED SURFACE PHOTOMETRY OF NGC 3077	<i>Jill S. Price and Craig A. Gullixson</i>	658
A FAST-MOVING KNOT OF RADIO EMISSION IN THE ACTIVE GALAXY NGC 1275 <i>J. M. Marr, D. C. Backer, M. C. H. Wright, A. C. S. Readhead, and R. Moore</i>	671	27-D1
CO IN OPTICALLY SELECTED STARBURST GALAXIES <i>James M. Jackson, Ronald L. Snell, Paul T. P. Ho, and Alan H. Barrett</i>	680	27-D10
HIGH-RESOLUTION CO OBSERVATIONS OF NGC 1068 <i>Noboru Kaneko, Kazuhiko Morita, Yasuo Fukui, Koji Sugitani, Takahiro Iwata, Naomasa Nakai, Norio Kaifu, and Harvey S. Liszt</i>	691	27-E7
CO ISOTOPE STUDIES AND MASS OF THE SAGITTARIUS B2 MOLECULAR CLOUD ... <i>Dariusz C. Lis and Paul F. Goldsmith</i>	704	27-F6
VLA OBSERVATIONS OF THE HIGH-VELOCITY BIPOLAR OH ABSORPTION IN L1551 <i>Luis F. Rodriguez, Jorge Cantó, I. Félix Mirabel, and Abraham Ruiz</i>	712	27-G1
SLOW EXPANSION OF THE SHELL OF THE RECURRENT NOVA T PYXIDIS AND DETECTION OF A FAINT EXTENDED ENVELOPE	<i>Michael M. Shara, Anthony F. J. Moffat, Robert E. Williams, and Judith G. Cohen</i>	720
VLBI ANGULAR BROADENING MEASUREMENTS IN THE CYGNUS REGION..... <i>A. L. Fey, S. R. Spangler, and R. L. Mutel</i>	730	
COMPARISON OF THE FAR-INFRARED AND CARBON MONOXIDE EMISSION IN HEILES' CLOUD 2 AND B18 <i>Ronald L. Snell, Mark H. Heyer, and F. Peter Schloerb</i>	739	
NEAR-INFRARED IMAGES OF THE BIPOLAR NEBULA OH 0739-14 <i>C. E. Woodward, W. J. Forrest, J. L. Pipher, A. Moneti, and M. A. Shure</i>	754	
PROPERTIES OF H II REGION POPULATIONS IN GALAXIES. II. THE H II REGION LUMINOSITY FUNCTION <i>Robert C. Kennicutt, Jr., B. Kevin Edgar, and Paul W. Hodge</i>	761	
MILLIMETER-WAVE RECOMBINATION LINES FROM RADIO-BRIGHT H II REGIONS	<i>M. A. Gordon</i>	782
THE OUTER R AQUARII NEBULA: COMPARISON OF 6 CENTIMETER RADIO CONTINUUM AND BALMER LINE EMISSION	<i>J. M. Hollis, R. J. Oliversen, and R. Mark Wagner</i>	795
RADIO PULSTAR SPIN-DOWN: TESTS OF PULSTAR MODELS	<i>Andrew F. Cheng</i>	803
SUPERNOVA 1987A AND THE EMERGENCE OF THE HOT NEUTRON STAR: A SEMIANALYTIC APPROACH <i>David F. Chernoff, Stuart L. Shapiro, and Ira Wasserman</i>	814	
A SEARCH FOR A DYNAMICAL ATTRACTOR IN CYGNUS X-1	<i>James C. Lochner, J. H. Swank, and A. E. Szymkowiak</i>	823
EXO 033319-2554.2: AN ECLIPSING AM HERCULIS SYSTEM SHOWING CYCLOTRON EMISSION FEATURES <i>Lilia Ferrario, D. T. Wickramasinghe, Jeremy Bailey, I. R. Tuohy, and J. H. Hough</i>	832	
A THIRD X-RAY SPECTRAL MODE IN SCORPIUS X-1: SIMILARITIES TO THE OTHER BRIGHT BULGE SOURCES <i>G. Hasinger, W. C. Priesthorsky, and J. Middleditch</i>	843	
DOUBLE-CORE EVOLUTION. III. THE EVOLUTION OF A 5 M_{\odot} RED GIANT WITH A 1 M_{\odot} COMPANION <i>Ronald E. Taam and Peter Bodenheimer</i>	849	
THE DUPLICITY OF IRAS 16293-2422: A PROTOBINARY STAR?	<i>Alwyn Wootten</i>	858
MAGNETIC ACTIVITY AND THE DETERMINATION OF THE TIDAL SYNCHRONIZATION TIME IN CLOSE BINARIES <i>James H. Applegate</i>	865	
POLARIMETRY OF FOUR WOLF-RAYET STARS	<i>Regina E. Schulte-Ladbeck and Karel A. van der Hucht</i>	872
A ROTATING, MAGNETIC, RADIATION-DRIVEN WIND MODEL FOR WOLF-RAYET STARS <i>Clint H. Poe, David B. Friend, and Joseph P. Cassinelli</i>	888	

CONTENTS

	Page	Fiche
WIND-DISK SHOCKS AROUND T TAURI STARS	<i>L. Hartmann and J. C. Raymond</i>	903
ON THE STABILITY OF DECELERATING SHOCKS	<i>Ethan T. Vishniac and Dongsu Ryu</i>	917
FLASHES FROM NORMAL STARS	<i>Bradley E. Schaefer</i>	927
VLBI AND POLARIMETRIC OBSERVATIONS OF THE SiO MASERS IN R CASSIOPEIAE <i>G. C. McIntosh, C. R. Predmore, J. M. Moran, L. J. Greenhill, A. E. E. Rogers, and R. Barvainis</i>	934	30-D9
COMET EJECTION AND DYNAMICS OF NONSPHERICAL DUST PARTICLES AND METEOROIDS	<i>Bo Å. S. Gustafson</i>	945
BORN-APPROXIMATION AND RADIATIVE CORRECTIONS TO PAIR PRODUCTION IN PHOTON-PHOTON COLLISIONS <i>Robert J. Gould</i>	950	30-E11
MINIMUM MACH NUMBER FOR IMPULSIVE PROTON ACCELERATION BY PARALLEL COLLISIONLESS SHOCK WAVES IN SOLAR FLARES	<i>Dean F. Smith and Stephen H. Brecht</i>	954
ISOTOPE ABUNDANCES OF SOLAR CORONAL MATERIAL DERIVED FROM SOLAR ENERGETIC PARTICLE MEASUREMENTS	<i>R. A. Mewaldt and E. C. Stone</i>	959
RELATIONS BETWEEN THE PHOTOSPHERIC MAGNETIC FIELD AND THE EMISSION FROM THE OUTER ATMOSPHERES OF COOL STARS. I. THE SOLAR Ca II K LINE CORE EMISSION <i>C. J. Schrijver, J. Coté, C. Zwaan, and S. H. Saar</i>	964	
SIPHON FLOWS IN ISOLATED MAGNETIC FLUX TUBES. II. ADIABATIC FLOWS <i>Benjamin Montesinos and John H. Thomas</i>	977	
MAGNETOHYDRODYNAMIC INSTABILITIES IN CORONAL ARCADES	<i>Chang-Hyuk An, S. T. Suess, and S. T. Wu</i>	989
THE SPATIAL, SPECTRAL, AND TEMPORAL CHARACTER OF THE HARD X-RAY FLARE OF 1982 FEBRUARY 3 <i>Nariaki Nitta, Alan L. Kiplinger, and Keizo Kai</i>	1003	
δ -MODE PULSATIONS IN POLYTROPES: HIGH-PRECISION EIGENVALUES AND THE APPROACH TO ASYMPTOTIC BEHAVIOR	<i>D. J. Mullan</i>	1017
PROPAGATION OBSERVATIONS OF THE SOLAR WIND NEAR THE SUN	<i>W. A. Coles and J. K. Harmon</i>	1023
ERRATUM		
THE VELOCITY DISPERSION OF THE GIANT MOLECULAR CLOUDS: A VISCous ORIGIN	<i>Chanda J. Jog and Jeremiah P. Ostriker</i>	1035
ABSTRACTS OF THE ASTROPHYSICAL JOURNAL SUPPLEMENT SERIES, 1989 MARCH ISSUE		
CALÁN-TOLOLO SURVEY. I. SEYFERT 1 GALAXIES	<i>José Maza, María Teresa Ruiz, Luis E. González, and Marina Wischnjewsky</i>	1036
SPECTROPHOTOMETRY OF CALÁN-TOLOLO SEYFERT GALAXIES: OBJECTS FROM LIST 1	<i>José Maza and María Teresa Ruiz</i>	1036
MULTICOLOR SURFACE PHOTOMETRY OF POWERFUL RADIO GALAXIES. I. OBSERVATIONS AND DATA REDUCTION <i>Eric P. Smith and T. M. Heckman</i>	1036	
APPARENT MAGNITUDES OF LUMINOUS PLANETARY NEBULA NUCLEI. II. A SURVEY OF SOUTHERN HEMISPHERE PLANETARY NEBULAE <i>Richard A. Shaw and James B. Kaler</i>	1037	
THE STELLAR WINDS OF 203 GALACTIC O STARS: A QUANTITATIVE ULTRAVIOLET SURVEY	<i>Ian D. Howarth and Raman K. Prinja</i>	1037
THE LUMINOSITY SCALE OF RR LYRAE STARS WITH THE BAADE-WESSELINK METHOD. I. PHOTOMETRY AND RADIAL VELOCITIES <i>Tianxing Liu and Kenneth A. Janes</i>	1038	
LUNAR OCCULTATIONS OF IRAS POINT SOURCES, 1991-2000	<i>L. Cassar, W. P. Chen, and M. Simon</i>	1038
LINE IDENTIFICATIONS IN THE ULTRAVIOLET SPECTRUM OF 31 CYGNI	<i>Wendy Hagen Bauer and Robert E. Stencel</i>	1038
INDEX TO VOLUME 337, PARTS 1 AND 2		See Part 2

THE ASTROPHYSICAL JOURNAL LETTERS

CONTENTS OF VOLUME 337, PART 2

1989 FEBRUARY 1, Number 1

	Page	Fiche
ANISOTROPY OF THE DIFFUSE BACKGROUND AT MILLIMETER WAVELENGTHS <i>G. M. Bernstein, M. L. Fischer, P. L. Richards, J. B. Peterson, and T. Timusk</i>	L1	25-A6
A SPIRAL GALAXY AT $z = 0.366$ WHICH OVERLAPS THE IMAGE OF THE QUASAR 4C 39.47 <i>Paul Hintzen, W. Romanishin, Craig Foltz, and William Keel</i>	L5	25-A10
BARS AND BARRED SPIRALS: LINEAR THEORY REVISITED <i>M. Tagger, J. F. Sygnet, and R. Pellat</i>	L9	25-B1
HIGH-RESOLUTION CORONAGRAPHY OF THE CIRCUMSTELLAR ENVIRONMENT OF SN 1987A <i>Francesco Paresce and Christopher Burrows</i>	L13	25-B6
HARD X-RAY SPECTRUM OF SUPERNOVA 1987A ON DAY 407 <i>P. Ubertini, A. Bazzano, R. Sood, R. Staubert, T. J. Sumner, and G. Frye</i>	L19	25-B11
MAGNETIZED NEUTRON STARS AS GAMMA-RAY BURSTERS: DETECTION RATES AT HIGH ENERGIES <i>P. Mészáros, Z. Bagoly, and H. Riffert</i>	L23	25-C1
INFRARED SPECTROSCOPY OF CEPHEIDS: PECULIAR VELOCITY STRUCTURE AND ITS EFFECT ON RADII AND DISTANCES <i>Dimitar D. Sasselov, John B. Lester, and Michael S. Fieldus</i>	L29	25-C7
HD 93521: A HIGH-LATITUDE SHELL STAR <i>Nelson J. Irvine</i>	L33	25-C11
HERBIG-HARO OBJECTS AS THE HEADS OF RADIATIVE JETS <i>John M. Blondin, Arieh Königl, and Bruce A. Fryxell</i>	L37	25-D1
INTERFEROMETRIC OBSERVATIONS OF 1.4 MILLIMETER CONTINUUM SOURCES <i>D. P. Woody, S. L. Scott, N. Z. Scoville, L. G. Mundy, A. I. Sargent, S. Padin, C. G. Tinney, and C. D. Wilson</i>	L41	25-D5
INTERFEROMETRIC $C^{18}O$ OBSERVATIONS OF DR 2(OH) AND L1551 IRS 5 AT $\lambda = 1.4$ MILLIMETERS <i>S. Padin, A. I. Sargent, L. G. Mundy, N. Z. Scoville, D. P. Woody, R. B. Leighton, C. R. Masson, S. L. Scott, T. V. Seling, K. R. Stapelfeldt, and S. Terebey</i>	L45	25-D9
THE SOLAR WIND MASS FLUX <i>George L. Withbroe</i>	L49	25-E1
THE RADIAL GRADIENT IN THE SUN'S ROTATION <i>W. A. Dziembowski, Philip R. Goode, and K. G. Libbrecht</i>	L53	25-E5
REACTION CROSS SECTION FOR "SOLAR FLARE NEUTRINOS" WITH ^{37}Cl AND ^{16}O TARGETS <i>M. Fukugita, Y. Kohyama, K. Kubodera, and T. Kuramoto</i>	L59	25-E11
INSTRUCTIONS TO AUTHORS OF LETTERS		<i>Inside Back Cover</i>

1989 FEBRUARY 15, Number 2

	Page	Fiche
COSMOLOGICAL PARAMETERS AND EVOLUTION OF THE GALAXY LUMINOSITY FUNCTION <i>David Coditz and Vahé Petrosian</i>	L65	32-A10
DETECTION OF STRONG CARBON MONOXIDE EMISSION FROM THE HOST GALAXY OF THE QUASAR 1 Zw 1 <i>Richard Barvainis, Danielle Alloin, and Robert Antonucci</i>	L69	32-B1
A GRAVITATIONAL LENS EXPLANATION FOR THE ARCLIKE STRUCTURE IN Cl 0500-24 <i>Joachim Wambsganss, Edmond Giraud, Peter Schneider, and Achim Weiss</i>	L73	32-B5

CONTENTS

	<i>Page</i>	<i>Fiche</i>
PERIOD DIFFERENCES BETWEEN X-RAY AND VERY HIGH ENERGY GAMMA-RAY OBSERVATIONS OF ACCRETING X-RAY PULSARS	K. S. Cheng and Malvin Ruderman	L77 32-B10
DISCOVERY OF A BRIGHT X-RAY NOVA, GS 2000+25 Hiroshi Tsunemi, Shunji Kitamoto, Sadanori Okamura, and Diane Rousell-Dupré	L81	32-C1
VLBI OBSERVATIONS OF SN 1986J: DEVIATIONS FROM SPHERICAL SYMMETRY IN ITS RADIO BRIGHTNESS DISTRIBUTION..... Norbert Bartel, Michael R. Rupen, and Irwin I. Shapiro	L85	32-C7
STUDYING SHOCKS IN MODEL ASTROPHYSICAL FLOWS	Sandip K. Chakrabarti	L89 32-C11
INDEX TO VOLUME 337, PARTS 1 AND 2		i 26-B1
INSTRUCTIONS TO AUTHORS OF <i>LETTERS</i>		<i>Inside Back Cover</i>

